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GLOBAL DATA MONITORING REPORT

March 1999

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RG12 2SZ

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis. The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

Dr. B. Macpherson
Head of Observation Processing and Monitoring Section
Data Assimilation
Meteorological Office
London Road
Bracknell
Berkshire
United Kingdom
RG12 2SZ

2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1-2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At RSMC Bracknell, for synoptic stations at or below a height of 500 metres, reported mean sea-level pressure is used in the statistics. If this is unavailable the mean sea-level pressure is calculated from the reported station-level pressure and temperature.

For synoptic stations above 500 metres, the mean sea-level pressure is calculated from the reported station-level pressure and temperature, or, if these are not available the height of a standard pressure-level (e.g.: 850 hPa or 700 hPa). If neither of these are available, the reported mean sea-level pressure is used.

Some stations vary their reporting practice according to the observation hour (e.g.: some stations in the CIS report both mean sea-level and station-level pressure at 00 & 12 UTC, but only mean sea-level pressure at 06 & 18 UTC). For monitoring purposes, reported mean sea-level pressure is stored separately from that calculated from station-level pressure or height of a standard pressure-level. Only statistics for the preferred method (see above) are presented in this report, and so for certain high-level stations, such as those from the CIS, approximately half of the number of observations actually received will appear in the statistics.

Aircraft observations

TABLE 4 contains a list of statistics calculated from data received from all airline carriers.

Figure 3 shows 10 degree lat/long box average numbers of aircraft reports (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) received per day throughout the month at Bracknell and assimilated into model runs in the layer 70-500 hPa. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4-7 show wind statistics for AIREP/ASDAR (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) in the layer 70-500 hPa. Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-27 show satellite mean observation-background temperature differences for NOAA-11 soundings at 500 km resolution and figures 28-30 show the same statistics for NOAA-14. Data are plotted where there are > 30 observations in a 10 degree lat/long box.

N.B. 500 km SATEMs are no longer assimilated into the UKMO global Unified Model. Both 500 km and 120 km SATEMs were replaced on 16th April 1996 by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS (from NOAA-11 and NOAA-14).

Figure	Layer (hPa)
25/28	850-1000
26/29	100-300
27/30	30-50

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics **(Geopotential Height and Windspeed at 100 and 500 hPa)** for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

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Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
6. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
7. January 1998. Increase in resolution of UKMO global forecast model.
8. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
9. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
10. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
11. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
12. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from Bracknell global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed ($m\ s^{-1}$).
:Wind direction (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 $m\ s^{-1}$ (vector wind)

SELECTION CRITERIA :NOBS $\geq$ 20 , and one or more of the following:

1.| bias| $\geq$ 4 hPa (pressure),
$\geq$ 5 $m\ s^{-1}$ (wind speed),
$\geq$ 30 degrees (direction).

2.SD $\geq$ 6 hPa (pressure),
$\geq$ 80 degrees (direction).

3.PGE $\geq$ 25

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
DPBP	ALL	P	SUR	41	1	2	1.0	-4.2	4.4
ELKZ5	ALL	P	SUR	21	0	0	1.9	4.1	4.5
ELUB5	ALL	P	SUR	61	0	0	3.7	5.2	6.4
ELVI2	ALL	P	SUR	111	0	0	1.3	-5.2	5.3
PEXX	ALL	P	SUR	45	0	0	1.8	-4.6	4.9
P3YR5	ALL	P	SUR	67	0	0	1.5	4.4	4.6
P3YS5	ALL	P	SUR	66	0	0	1.2	4.1	4.3
UAIS	ALL	P	SUR	22	0	0	1.7	-6.9	7.1
UCJI	ALL	P	SUR	23	0	0	1.4	-8.0	8.1
UCUP	ALL	P	SUR	22	2	9	7.3	0.1	7.3
UDUE	ALL	P	SUR	21	7	33	0.8	12.2	12.2
UFJJ	ALL	P	SUR	64	1	2	1.8	-5.0	5.3
UIAG	ALL	P	SUR	34	0	0	1.7	-10.6	10.7
VVGG	ALL	P	SUR	26	0	0	1.9	6.4	6.7
WDZB	ALL	P	SUR	64	0	0	0.9	-6.0	6.1
WQZ9670	ALL	P	SUR	27	0	0	2.0	-6.5	6.8
ZCAM9	ALL	P	SUR	52	0	0	2.2	7.7	8.0
ZSDN	ALL	P	SUR	39	0	0	1.2	5.4	5.6
3ECI8	ALL	P	SUR	77	0	0	1.1	-4.6	4.7
3FGN3	ALL	P	SUR	24	0	0	1.7	-7.7	7.9
3FGQ3	ALL	P	SUR	42	0	0	1.2	9.8	9.9
48102	ALL	P	SUR	43	37	86	0.5	-0.6	0.8
9MCM	ALL	P	SUR	45	0	0	1.9	4.3	4.7
WIND SPEED									
CGTF	ALL	SPEED	SUR	42	0	0	4.8	5.6	7.3
C6HS4	ALL	SPEED	SUR	21	0	0	6.1	5.8	8.5
C6KF8	ALL	SPEED	SUR	74	2	3	5.4	9.1	10.6
C6LQ3	ALL	SPEED	SUR	21	1	5	3.9	8.3	9.2
DPBP	ALL	SPEED	SUR	36	0	0	6.8	6.5	9.4
DUQM	ALL	SPEED	SUR	28	0	0	3.1	8.8	9.3
DUXW	ALL	SPEED	SUR	55	0	0	4.9	5.4	7.3
DXQC	ALL	SPEED	SUR	32	0	0	2.8	5.3	6.0
D5HD	ALL	SPEED	SUR	58	0	0	3.7	5.2	6.4
ELGG3	ALL	SPEED	SUR	26	1	4	3.3	8.0	8.7
ELVG7	ALL	SPEED	SUR	42	0	0	5.1	7.0	8.7
ELVY8	ALL	SPEED	SUR	31	0	0	2.3	5.4	5.9
FNIA	ALL	SPEED	SUR	33	0	0	7.0	7.2	10.0
FNOQ	ALL	SPEED	SUR	64	0	0	2.9	-6.3	6.9
KGTZ	ALL	SPEED	SUR	46	0	0	4.4	5.4	7.0
LAHG2	ALL	SPEED	SUR	21	0	0	1.8	5.5	5.8
LAVX4	ALL	SPEED	SUR	25	0	0	2.5	5.6	6.2
PDTQ	ALL	SPEED	SUR	51	0	0	8.7	5.6	10.4
PGDC	ALL	SPEED	SUR	77	0	0	6.6	6.2	9.0
PJAG	ALL	SPEED	SUR	50	0	0	5.7	10.9	12.3
PJED	ALL	SPEED	SUR	58	0	0	5.5	5.3	7.7
SXYY	ALL	SPEED	SUR	111	4	4	6.4	6.7	9.3
SYMK	ALL	SPEED	SUR	41	0	0	2.8	5.5	6.1
V2TE	ALL	SPEED	SUR	40	0	0	7.3	7.7	10.6
WBP3210	ALL	SPEED	SUR	52	0	0	5.2	5.9	7.8
21004	ALL	SPEED	SUR	283	0	0	22.4	18.2	28.9
3FJC6	ALL	SPEED	SUR	41	0	0	3.2	5.1	6.0
3FTW	ALL	SPEED	SUR	67	0	0	3.9	5.8	6.9
63101	ALL	SPEED	SUR	975	0	0	4.7	-5.1	7.0
9HIG4	ALL	SPEED	SUR	60	0	0	3.7	5.0	6.2
9MUG	ALL	SPEED	SUR	42	0	0	4.5	11.2	12.1
9VWH	ALL	SPEED	SUR	48	24	50	9.9	8.9	13.3
WIND DIRECTION									
46012	ALL	DIRN.	SUR	36	0	0	85.3	7.5	85.6
46053	ALL	DIRN.	SUR	43	0	0	16.4	-36.6	40.1

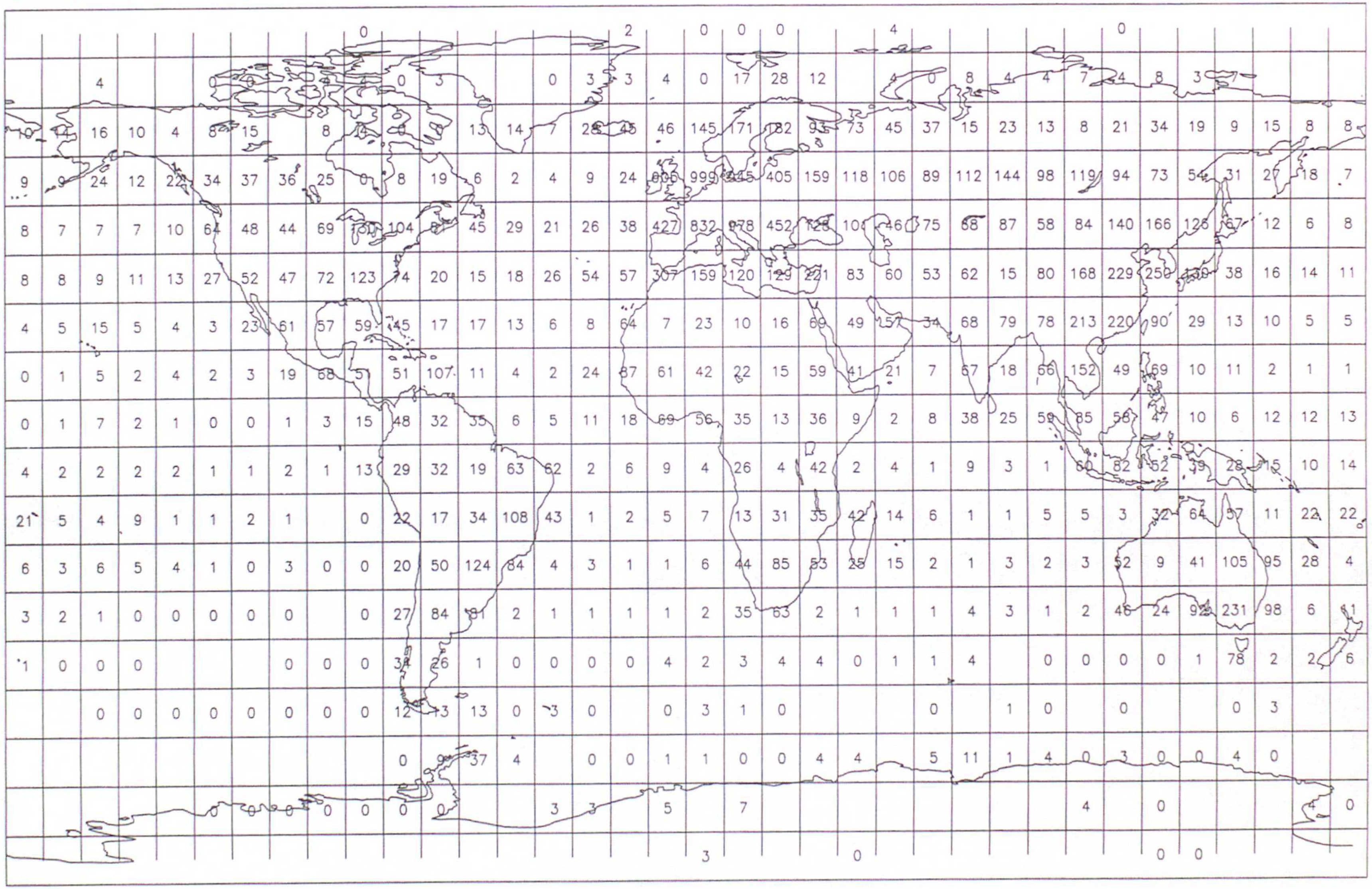
AVAILABILITY – SHIP/SYNOP – MARCH 1999

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 20644

FIGURE 1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9 9 24 12 22 34 37 36 25 0 8 19 6 2 4 9 24 806 999 845 405 159 118 106 89 112 144 98 119 94 73 54 31 27 18 7
8 7 7 7 10 64 48 44 69 130 104 81 45 29 21 26 38 427 832 978 452 128 108 46 75 68 87 58 84 140 166 126 67 12 6 8
8 8 9 11 13 27 52 47 72 123 74 20 15 18 26 54 57 307 159 120 129 221 83 60 53 62 15 80 168 229 250 130 38 16 14 11
4 5 15 5 4 3 23 61 57 59 45 17 17 13 6 8 64 7 23 10 16 69 49 157 34 68 79 78 213 220 90 29 13 10 5 5
0 1 5 2 4 2 3 19 68 51 51 107 11 4 2 24 87 61 42 22 15 59 41 21 7 67 18 66 152 49 69 10 11 2 1 1
0 1 7 2 1 0 0 1 3 15 48 32 35 6 5 11 18 69 56 35 13 36 9 2 8 38 25 59 85 56 47 10 6 12 12 13
4 2 2 2 2 1 1 2 1 13 29 32 19 63 62 2 6 9 4 26 4 42 2 4 1 9 3 1 60 82 52 39 28 15 10 14
21 5 4 9 1 1 2 1 0 22 17 34 108 43 1 2 5 7 13 31 35 42 14 6 1 1 5 5 3 32 64 57 11 22 22
6 3 6 5 4 1 0 3 0 0 20 50 124 84 4 3 1 1 6 44 85 53 25 15 2 1 3 2 3 52 9 41 105 95 28 4
3 2 1 0 0 0 0 0 0 27 84 81 2 1 1 1 1 2 35 63 2 1 1 1 4 3 1 2 46 24 92 231 98 6 11
1 0 0 0 0 0 0 34 26 1 0 0 0 0 4 2 3 4 4 0 1 1 4 0 0 0 0 1 78 2 2 6
0 0 0 0 0 0 0 0 12 13 13 0 3 0 0 3 1 0 0 1 0 0 0 3
0 0 37 4 0 0 1 1 0 0 4 4 5 11 1 4 0 3 0 0 4 0
0 0 0 0 0 0 0 0 3 3 5 7 4 0 4 0
3 0 0 0

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures			
Period		:One calendar month.	
Data monitored		:Reports from each unique identifier for drifting buoys.	
Standard of comparison		:Background field from Bracknell global model.	
Position		:Average latitude and longitude for period.	
Observation times		:00, 06, 12, 18 UTC	
Elements monitored		:Mean sea level pressure (hPa). :Wind speed (m s^{-1}). :Wind direction (degrees).	
Parameters monitored	:NOBS	:Number of observations received excluding duplicates.	
	:NGE	:Number of observations with gross errors.	
	:PGE	:Percentage of observations with gross errors.	
	:SD	:SD of difference of observations from background values excluding those with gross errors.	
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the observation is veered to the background.**	
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.	
GROSS ERROR LIMIT	:15 hPa :25 m s^{-1}	(pressure) (vector wind)	
SELECTION CRITERIA :	NOBS	≥ 20 , and one or more of the following:	
	1.| bias|	≥ 4 hPa ≥ 5 m s^{-1} ≥ 30 degrees	(pressure), (wind speed), (direction).
	2.SD	≥ 6 hPa ≥ 80 degrees	(pressure), (direction).
	3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
33903	-35.9	18.5	ALL	P	SUR	79	3	4	4.1	4.3	6.0
35538	-36.0	-36.8	ALL	P	SUR	42	14	33	0.9	0.8	1.2
46660	44.7	-63.6	ALL	P	SUR	45	0	0	1.8	-5.5	5.7
53903	-16.6	70.2	ALL	P	SUR	84	5	6	7.3	-2.8	7.8
WIND SPEED											
21531	37.0	-150.0	ALL	SPEED	SUR	547	0	0	2.7	-5.7	6.3
WIND DIRECTION											
46560	39.5	-125.8	ALL	DIRN.	SUR	280	0	0	65.1	-47.5	80.6
55587	-42.4	164.6	ALL	DIRN.	SUR	476	0	0	23.6	45.1	50.9

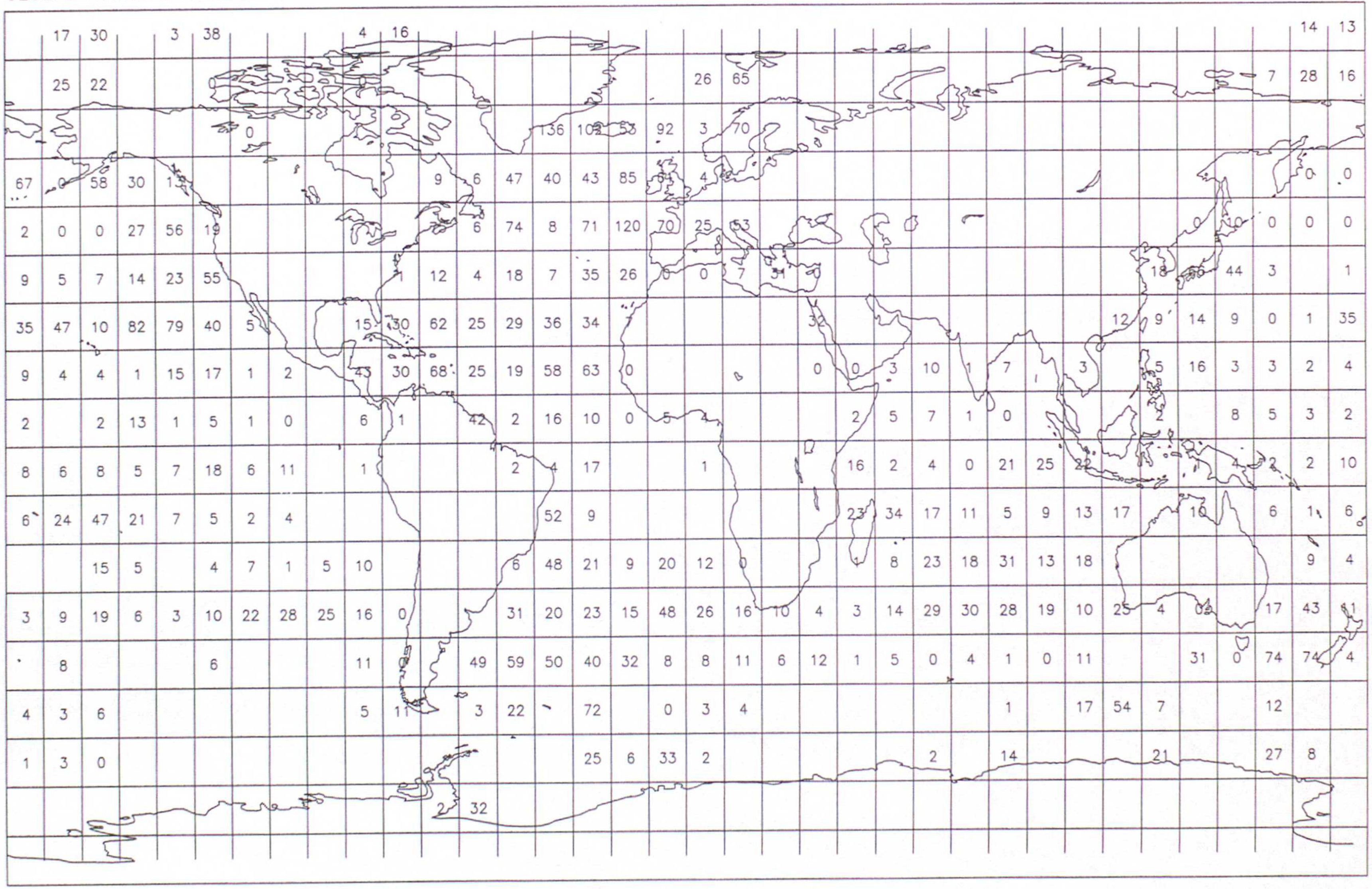
AVAILABILITY – DRIFTER – MARCH 1999

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 5746

FIGURE 2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25 22 26 65 7 28 16
0 136 102 53 92 3 70
67 0 58 30 13 9 6 47 40 43 85 64 4 0 0
2 0 0 27 56 19 6 74 8 71 120 70 25 53 0 10 0 0 0
9 5 7 14 23 55 1 12 4 18 7 35 26 0 0 7 31 0 18 30 44 3 1
35 47 10 82 79 40 5 15 30 62 25 29 36 34 7 32 12 9 14 9 0 1 35
9 4 4 1 15 17 1 2 43 30 68 25 19 58 63 0 0 0 3 10 1 7 3 5 16 3 3 2 4
2 2 13 1 5 1 0 6 1 42 2 16 10 0 5 4 2 5 7 1 0 2 8 5 3 2
8 6 8 5 7 18 6 11 1 2 4 17 1 16 2 4 0 21 25 22 2 2 10
6 24 47 21 7 5 2 4 52 9 23 34 17 11 5 9 13 17 10 6 1 6
15 5 4 7 1 5 10 6 48 21 9 20 12 0 1 8 23 18 31 13 18 9 4
3 9 19 6 3 10 22 28 25 16 0 31 20 23 15 48 26 16 10 4 3 14 29 30 28 19 10 25 4 0 17 43 41
8 6 11 49 59 50 40 32 8 8 11 6 12 1 5 0 4 1 0 11 31 0 74 74 4
4 3 6 5 11 3 22 72 0 3 4 1 17 54 7 12
1 3 0 25 6 33 2 2 14 21 27 8
2 32

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from Bracknell global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Mean sea level pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:
	1.| bias|	≥ 4 hPa
	2. SD	≥ 6 hPa
	3.PGE	≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60445	36.2N	5.4E	1081	S8	98	0	0	0	0.8	4.7	4.8
60468	35.6N	6.2E	1052	S8	96	96	100	0			
60511	35.3N	1.4E	1127	S8	99	70	71	0	2.5	13.9	14.1
60535	34.7N	3.3E	1144	S8	74	1	1	0	1.0	-6.6	6.7
60571	31.6N	2.2W	773	S8	102	0	0	1	1.5	-4.2	4.5
60670	24.6N	9.5E	1054	S8	101	3	3	0	1.2	9.2	9.3
63330	13.5N	39.5E	2070	MS	51	51	100	0			
63334	10.3N	37.7E	2515	MS	78	0	0	0	1.2	10.3	10.4
63450	9.0N	38.8E	2354	MS	91	0	0	0	1.2	5.4	5.5
63471	9.6N	41.9E	1260	MS	97	0	0	0	0.8	10.4	10.4
63478	5.9N	43.6E	295	MS	52	0	0	0	1.1	6.7	6.8
68350	26.7S	27.1E	1351	S8	105	0	0	30	2.1	10.7	10.9
68396	26.5S	31.3E	641	S8	57	0	0	4	1.4	4.7	4.9

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
24671	63.9N	135.9E	402	MS	116	1	1	3	2.9	7.5	8.0
30320	56.9N	105.7E	669	MS	116	58	50	0	2.1	0.9	2.3
30664	53.5N	115.6E	811	MS	29	0	0	31	1.0	-5.1	5.2
30967	49.9N	115.8E	623	MS	78	2	3	5	2.7	-4.9	5.6
31123	57.8N	130.9E	255	MS	58	0	0	3	2.6	4.1	4.9
40743	36.2N	57.7E	941	MS	112	1	1	2	1.6	-5.5	5.7
40762	35.3N	59.2E	1333	MS	111	6	5	0	1.0	-12.7	12.7
41254	23.1N	57.7E	1755	S8	89	89	100	0			
41535	34.2N	73.3E	1308	8	51	0	0	6	1.8	-6.2	6.5
44218	48.0N	91.6E	1406	MS	105	0	0	0	1.4	-4.0	4.2
44231	49.6N	100.2E	1285	MS	105	2	2	1	1.5	-4.3	4.6
44237	48.5N	101.4E	1510	MS	104	0	0	9	3.0	-4.3	5.2
44239	48.8N	103.6E	1209	MS	100	1	1	3	1.7	-6.4	6.6
44256	49.6N	114.4E	706	MS	100	1	1	10	2.4	-5.1	5.6
44272	47.8N	96.9E	1761	MS	107	1	1	0	1.4	-7.1	7.2
44275	46.8N	98.1E	2255	MS	108	3	3	4	1.8	-8.1	8.3
44277	46.4N	96.3E	2182	MS	109	1	1	3	1.9	-5.2	5.5
44282	47.4N	101.5E	1693	MS	104	0	0	1	1.9	-4.9	5.3
44284	46.7N	100.1E	2125	MS	108	1	1	1	1.8	-4.8	5.1
44285	46.9N	102.8E	1662	MS	105	1	1	1	1.9	-5.3	5.6
44287	46.1N	100.7E	1860	MS	107	2	2	2	1.3	-5.9	6.0
44288	46.3N	102.8E	1813	MS	105	1	1	0	1.2	-6.2	6.3
44292	47.9N	106.9E	1307	MS	108	0	0	0	1.5	-4.9	5.1
44294	47.3N	107.5E	1429	MS	96	5	5	2	2.2	-6.3	6.7
44298	46.4N	108.2E	1287	MS	106	0	0	0	1.7	-6.8	7.0
44302	47.8N	112.1E	926	MS	102	2	2	3	2.2	-5.0	5.5
44304	47.3N	110.6E	1035	MS	105	1	1	0	1.6	-4.6	4.9
44305	46.7N	113.3E	982	MS	99	0	0	0	1.7	-4.6	4.9
44313	47.6N	118.6E	689	MS	91	1	1	0	2.0	-7.0	7.3
44336	45.4N	103.9E	1317	MS	93	0	0	0	1.5	-6.4	6.6
44341	45.8N	106.3E	1396	MS	95	0	0	1	1.7	-6.6	6.8
44347	44.4N	105.3E	1297	MS	105	1	1	0	1.5	-6.9	7.1
44352	45.7N	112.4E	1101	MS	91	0	0	0	2.0	-4.9	5.3
44354	44.9N	110.1E	936	MS	107	2	2	2	2.1	-6.5	6.8
44358	43.7N	111.9E	965	MS	103	0	0	0	1.9	-5.9	6.2
44373	43.6N	104.4E	1465	MS	106	0	0	0	1.4	-6.7	6.8
44477	27.0N	87.4E	1445	S8	51	51	100	0			
47022	40.8N	128.2E	1200	S	69	1	1	3	1.2	4.3	4.5
50915	45.5N	117.0E	840	MS	116	0	0	0	1.8	-4.6	4.9
51288	45.4N	90.5E	1651	S	119	0	0	11	1.7	-4.3	4.6

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
51334	44.6N	82.9E	321	M	118	1	1	2	2.2	5.3	5.7
51495	43.5N	91.6E	874	M	117	0	0	2	1.8	7.3	7.5
51573	42.9N	89.2E	37	MS	118	0	0	2	2.1	-6.9	7.2
52203	42.8N	93.5E	739	MS	118	0	0	0	1.7	-4.7	5.0
52267	41.9N	101.1E	941	MS	119	0	0	0	1.4	-4.8	5.0
52495	40.8N	104.5E	1329	MS	119	0	0	0	1.4	-4.4	4.6
52602	38.8N	93.4E	2734	S	119	0	0	0	1.3	-7.6	7.7
52737	37.4N	97.4E	2982	S	119	0	0	0	1.3	-4.5	4.7
52754	37.3N	100.1E	3301	S	119	0	0	0	1.1	-4.6	4.7
52866	36.6N	101.8E	2262	S	119	0	0	0	1.6	-8.4	8.6
52955	35.6N	100.8E	3201	S	119	0	0	7	1.2	6.4	6.5
52996	35.4N	105.0E	2450	S	119	0	0	1	2.0	-4.6	5.0
53068	43.6N	112.0E	966	MS	118	0	0	0	1.7	-5.2	5.5
53149	42.5N	110.1E	1223	MS	118	0	0	0	1.6	-6.5	6.7
53192	44.0N	115.0E	1128	MS	118	0	0	2	1.9	-4.1	4.5
53231	41.4N	106.4E	1510	S	118	0	0	0	1.6	-4.6	4.9
53276	42.4N	112.9E	1152	MS	117	0	0	0	1.6	-5.1	5.3
53336	41.6N	108.5E	1290	MS	118	0	0	0	1.4	-6.1	6.3
53391	41.9N	114.0E	1484	MS	118	0	0	1	1.4	-4.6	4.8
53513	40.8N	107.4E	1041	MS	119	0	0	0	1.5	-5.3	5.5
53529	39.1N	108.0E	1381	MS	118	0	0	1	1.5	-4.3	4.6
53543	39.8N	110.0E	1459	MS	118	0	0	0	1.4	-4.0	4.2
53588	39.0N	113.5E	2898	S	119	119	100	0			
53614	38.5N	106.2E	1112	MS	119	0	0	0	1.4	-4.4	4.6
53723	37.8N	107.4E	1349	MS	119	0	0	0	1.4	-4.0	4.2
54012	44.6N	117.6E	997	MS	116	0	0	0	1.7	-4.0	4.3
54102	43.9N	116.1E	991	MS	119	0	0	0	1.7	-5.2	5.5
54208	42.2N	116.5E	1247	MS	118	0	0	1	1.8	-4.0	4.4
54587	39.1N	123.2E	35	M	89	1	1	1	1.0	-5.1	5.2
56018	32.9N	95.3E	4068	S	119	0	0	0	1.2	-4.8	4.9
56021	34.1N	95.8E	4176	S	119	0	0	0	1.3	-8.0	8.1
56029	33.0N	97.0E	3682	S	119	0	0	0	1.1	-5.4	5.5
56033	34.9N	98.2E	4273	S	119	0	0	0	1.0	-4.3	4.4
56046	33.8N	99.7E	3968	S	119	0	0	0	1.1	-4.1	4.2
56065	34.7N	101.6E	3500	S	119	0	0	0	1.0	-5.8	5.9
56079	33.6N	103.0E	3441	S	119	0	0	0	1.6	-4.0	4.3
56106	31.9N	93.8E	4024	S	116	0	0	0	1.1	-6.1	6.2
56116	31.4N	95.6E	3874	S	118	0	0	0	1.1	-4.9	5.0
56137	31.1N	97.2E	3307	S	117	0	0	0	1.4	-4.3	4.5
56144	31.8N	98.6E	3184	S	108	1	1	0	1.3	-11.0	11.1
56167	31.0N	101.1E	2959	S	117	2	2	3	2.4	-5.3	5.8
56172	31.9N	102.2E	2666	S	119	1	1	6	2.4	-7.0	7.4
56182	32.6N	103.6E	2852	S	116	0	0	1	1.9	-5.3	5.6
56385	29.5N	103.3E	3049	S	119	2	2	37	2.0	-10.1	10.3
56444	28.5N	98.9E	3488	S	117	41	35	26	0.9	13.5	13.5
56462	29.0N	101.5E	2994	S	117	2	2	4	1.8	4.9	5.2
57046	34.5N	110.1E	2063	S	119	0	0	40	2.4	-4.2	4.8
58437	30.1N	118.2E	1836	S	118	0	0	5	1.9	-5.5	5.8

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	128	MS	43	0	0	0	1.3	-6.5	6.6
82336	3.1S	58.4W	40	MS	77	0	0	5	2.0	-4.1	4.6
82704	7.6S	72.7W	170	MS	75	0	0	1	1.6	-4.6	4.9
83214	10.3S	54.9W	285	MS	61	0	0	3	2.4	-5.8	6.3
83235	12.4S	46.4W	604	MS	80	0	0	1	1.3	6.3	6.4

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
83319	14.7S	52.4W	315	MS	81	0	0	0	1.3	-5.0	5.2
83332	14.1S	46.4W	826	MS	77	2	3	0	0.9	12.7	12.7
83408	14.3S	43.8W	447	MS	72	1	1	1	1.0	9.8	9.9
83423	16.7S	49.3W	741	MS	79	0	0	0	1.1	-6.2	6.3
83488	17.8S	42.9W	1097	MS	81	81	100	0			
83531	18.6S	46.5W	940	MS	79	0	0	0	1.0	-7.1	7.2
83587	19.9S	43.9W	850	MS	80	0	0	0	0.9	-7.0	7.1
83773	23.1S	48.9W	793	S	43	0	0	0	1.2	-5.9	6.0
83836	25.5S	50.6W	837	MS	81	1	1	47	1.2	-4.1	4.3
84455	6.5S	76.4W	281	MS	52	0	0	0	1.3	4.1	4.3
84472	7.1S	78.5W	2620	S	38	1	3	3	0.7	-6.9	6.9
84686	13.6S	72.0W	3248	S	78	0	0	0	1.0	-7.6	7.7
84735	15.5S	70.2W	3826	S	45	0	0	0	1.7	-4.0	4.3
84782	18.1S	70.3W	468	MS	72	0	0	6	1.4	6.2	6.4
85406	18.3S	70.3W	55	M	113	0	0	1	1.2	4.3	4.5
85836	43.6S	71.8W	277	M	42	0	0	2	1.9	5.2	5.5

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
76118	30.4N	109.7W	1040	MS	40	2	5	3	1.1	-12.1	12.1
76160	29.1N	111.0W	211	MS	37	0	0	27	1.2	-4.0	4.2
76625	20.6N	100.4W	1813	MS	21	0	0	0	0.7	-7.5	7.5
76632	20.1N	98.7W	2417	MS	28	0	0	0	0.6	-5.5	5.5
76658	19.2N	103.7W	494	MS	49	0	0	2	1.6	6.5	6.7
76750	18.5N	88.3W	9	MS	104	0	0	2	2.2	-8.0	8.3
76773	17.8N	97.8W	1680	MS	21	0	0	0	0.8	7.2	7.2
76775	17.1N	96.7W	1550	MS	61	0	0	0	1.0	4.0	4.1
76845	16.7N	92.6W	2276	MS	103	103	100	0			
78718	14.4N	87.6W	626	MS	40	32	80	0	0.2	-14.5	14.5

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
91163	21.9N	159.6W	7	8	354	354	100	0			
94328	22.4S	133.6E	623	MS	111	0	0	0	0.7	5.8	5.8
94955	41.6S	145.7E	684	MS	114	114	100	0			
95952	41.9S	145.6E	560	MS	116	116	100	0			
96505	3.7N	115.7E	924	S8	38	35	92	0	1.0	4.4	4.5
96751	6.7S	106.9E	941	S8	75	72	96	0	0.3	0.6	0.7

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
01360	61.9N	7.9E	712	MS	55	0	0	93	1.1	5.8	5.9
04207	81.7N	59.9W	105	MS	111	0	0	1	1.3	-4.2	4.4
11146	47.1N	13.0E	3105	S7	89	1	1	17	1.3	-4.4	4.6
11180	47.7N	15.8E	1546	S8	116	0	0	16	1.0	-4.0	4.1
11343	47.1N	13.0E	3105	S	118	0	0	14	1.4	-4.1	4.3
16614	40.4N	21.3E	604	MS	99	0	0	0	1.2	-6.7	6.8
17092	39.8N	39.5E	1218	S8	120	0	0	0	1.3	8.3	8.4
17203	38.9N	40.5E	1177	S8	102	0	0	33	1.2	4.0	4.2

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89272	75.0S	70.8W	1395	S	249	131	53	13	1.6	-12.9	13.0
89324	80.0S	119.4W	1530	S	280	10	4	7	3.7	-4.2	5.6
89805	74.1S	109.8E	3096	S	190	50	26	12	1.3	2.7	3.0

TABLE 4

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from Bracknell global model.
Observation times		:All hours combined.
Level(s) monitored		:70.0 - 500.0 hPa
Elements monitored		:TEMP in °C ; WIND in $m\ s^{-1}$
Parameters monitored		
	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.
GROSS ERROR LIMITS		:10.0 °C ; 60 $m\ s^{-1}$ Vector Wind
SELECTION CRITERIA		:N REP $\geq$ 20

NB: US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAA	65	0	22	1.6	0.9	63	0	22	0	5.1	-0.2
AAH	64	3	22	2.0	0.0	69	0	19	0	13.8	2.7
AAL	6062	1	31	1.8	0.0	5192	0	23	0	8.2	0.7
AAR	1155	0	6	2.1	-0.5	1151	0	7	0	10.1	0.7
ACA	1882	1	17	1.9	-0.2	1719	0	9	0	6.9	0.8
ACI	41	0	41	1.5	-0.4	41	0	39	0	7.5	3.4
AEA	459	1	26	2.0	0.2	385	0	18	0	8.9	0.9
AEL	1005	1	12	1.8	-0.3	1005	0	12	0	8.4	0.9
AEY	187	1	4	1.7	0.7	183	0	3	0	9.1	-0.1
AFL	483	0	14	2.1	0.6	446	0	9	0	8.2	0.3
AFR	2073	1	12	1.8	0.1	2056	0	12	0	9.1	1.1
AIH	241	0	10	1.9	0.1	233	0	6	0	7.3	0.8
AJM	128	0	3	1.7	-1.0	127	0	6	0	8.6	1.0
AMM	87	0	11	1.6	0.1	81	0	5	0	6.6	1.2
AMT	706	1	41	1.7	0.5	702	0	41	0	7.7	0.5
AMX	314	5	10	2.3	-0.1	309	0	3	0	8.6	1.5
ANA	1289	0	7	2.1	-0.2	1280	0	7	0	8.7	0.6
ANO	50	0	2	0.9	-0.1	50	0	2	0	5.7	-0.5
ANZ	3851	1	41	1.8	0.0	3797	0	41	0	9.0	1.0
AOM	878	1	5	1.7	0.6	875	0	4	0	8.5	0.8
ARG	36	3	8	2.3	0.6	36	0	3	0	7.2	1.6
ASY	46	0	24	2.0	1.7	45	0	24	0	5.1	0.0
AVA	477	1	4	1.8	-0.1	475	1	5	0	9.1	0.6
AVE	124	0	2	1.7	0.8	124	0	4	0	9.1	1.5
AVN	76	5	5	0.8	0.1	71	0	0	0	6.3	0.6
AXF	101	3	46	0.9	0.0	99	0	44	0	9.6	2.5
AZA	552	2	28	2.5	0.6	465	1	20	0	8.3	0.6
BAF	21	5	19	1.8	-0.5	21	5	24	0	8.7	1.5
BAL	528	1	15	1.4	-0.1	525	0	16	0	9.2	1.1
BAW	1806	2	21	2.1	-0.2	1677	0	16	0	7.5	1.0
BLX	60	0	3	1.9	-0.3	60	0	2	0	7.2	0.7
BWA	425	1	16	2.2	1.5	380	0	10	0	9.5	0.5
CAL	1262	1	6	2.0	0.0	1270	1	8	0	9.7	0.7
CCA	288	2	71	2.7	0.6	312	1	100	0	14.2	-0.3
CDN	2350	0	11	2.0	0.3	2263	0	10	0	8.9	0.7
CES	288	1	6	1.8	0.1	297	1	100	0	11.4	0.4
CFG	1174	1	8	1.9	-0.6	1139	0	5	0	8.5	0.9
CKS	410	1	37	1.6	-0.1	406	0	37	0	6.9	0.4
CKT	181	1	14	1.9	1.0	171	0	9	0	8.3	0.8
CLX	428	1	8	1.7	-0.2	412	0	4	0	6.7	0.6
CMI	470	0	6	1.8	0.6	474	0	5	0	9.3	0.7
CMM	369	1	14	2.1	-0.1	358	1	13	0	9.0	1.0
COA	1673	1	31	1.9	0.1	1501	0	27	0	10.5	1.6
CPA	56	4	5	1.7	-0.3	59	0	2	0	6.3	1.1
CRL	997	1	6	1.5	0.3	988	0	5	0	7.9	0.8
CSN	67	6	15	2.2	0.4	66	0	12	0	12.6	0.8
CTB	334	1	5	1.9	-0.6	336	0	5	0	9.1	1.2
CUB	535	2	12	2.0	1.0	517	0	9	0	9.7	1.1
DAF	69	0	0	1.9	-0.9	66	0	0	0	7.4	1.9
DAL	4596	1	39	1.8	0.3	4082	0	35	0	7.8	0.7
DBY	656	1	3	1.8	-0.7	665	0	4	0	9.5	0.6
DLH	3091	1	18	1.9	-0.1	2798	0	13	0	8.1	0.6
EEZ	60	3	30	1.9	-0.1	57	0	32	0	11.5	-1.6
EIA	325	1	35	1.7	0.4	323	1	34	0	9.5	0.8
ELY	146	1	10	1.9	-0.1	146	0	5	0	6.5	1.0
EVA	1869	0	4	1.9	-0.2	1910	0	5	0	9.5	0.6
EWW	101	0	27	1.6	0.3	87	0	17	0	9.8	2.3
FDX	1661	1	27	1.7	0.5	1512	0	23	0	8.3	0.5
FIN	517	1	23	2.0	0.3	413	0	11	0	7.1	0.8

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
FJI	1050	3	36	1.7	0.3	1029	0	34	0	8.5	1.1
FOM	233	3	37	1.2	0.6	224	0	35	0	7.5	0.8
GAF	42	0	52	2.5	-1.6	26	0	23	0	7.4	-0.3
GCO	20	0	0	3.3	1.8	21	0	5	0	11.3	-0.5
GHA	39	0	0	1.3	0.0	39	3	8	0	12.7	2.8
GIA	55	0	25	1.8	0.5	55	0	24	0	7.6	2.7
GTI	67	3	33	2.1	0.5	58	0	24	0	7.2	1.8
HAL	3226	0	35	1.4	-0.1	3182	0	36	0	9.1	0.9
HLF	102	1	19	2.1	-0.6	96	0	13	0	8.9	0.5
HLQ	55	2	11	2.0	0.8	55	0	7	0	7.9	0.9
HRH	75	4	55	0.9	0.5	69	0	51	0	5.3	1.2
IBE	2964	1	22	2.1	0.5	2782	0	17	0	9.1	1.0
ICE	1000	1	28	2.0	0.0	784	0	17	0	7.2	0.9
IWD	23	13	26	1.6	-0.7	21	0	19	0	9.2	0.8
JAL	6170	0	5	2.1	0.1	6162	0	5	0	9.3	1.0
JAZ	44	0	14	2.2	1.8	41	0	15	0	6.3	1.7
JKK	214	1	31	1.7	-0.2	175	1	18	0	9.5	1.3
KAL	3136	1	9	2.1	-0.3	3117	0	10	0	10.4	0.8
KLM	3167	0	18	1.8	0.3	2980	0	15	0	7.6	0.8
LAP	22	0	5	2.7	1.4	21	0	33	0	8.9	2.1
LDA	129	2	19	1.8	0.4	116	0	16	0	8.9	1.6
LDI	867	1	30	2.1	-0.9	738	0	22	0	8.7	0.8
LIB	514	2	4	1.8	0.9	512	1	5	0	9.2	0.6
LOT	181	1	33	2.0	-0.9	139	1	19	0	7.3	-0.1
LTU	796	2	29	1.9	-0.4	637	0	15	0	7.7	0.8
LXR	71	0	6	2.1	0.9	72	0	7	0	7.8	0.7
MAS	409	0	11	1.8	-0.2	414	0	10	0	9.0	1.0
MDA	38	0	0	2.0	-1.0	40	0	0	0	12.3	1.8
MON	25	0	12	1.6	0.2	24	0	13	0	6.0	0.6
MPD	243	3	16	2.0	0.8	216	0	11	0	10.3	0.1
MPH	783	0	12	1.6	-0.4	741	0	7	0	7.6	0.6
NCA	646	0	3	1.7	0.2	640	1	4	0	8.6	1.0
NWA	10530	0	13	1.9	0.6	10211	0	12	0	8.6	0.5
PAC	193	2	28	1.9	0.4	179	0	23	0	9.7	0.3
PAL	982	1	9	1.8	-0.3	958	0	11	0	9.4	1.0
PAO	300	2	43	1.0	0.0	294	0	43	0	8.8	0.6
PAQ	28	4	4	1.4	0.3	28	0	0	0	8.3	1.4
QFA	2034	1	50	1.8	0.1	2020	0	50	0	8.9	0.6
RAF	102	0	0	1.7	1.2	100	0	0	0	8.0	2.2
RAM	44	0	2	2.4	-0.2	44	0	2	0	8.6	2.4
RCH	423	4	25	2.3	0.6	395	0	100	0	11.5	1.9
RKA	102	0	2	1.6	-0.5	101	0	4	0	10.7	2.0
RRR	86	0	29	1.8	-0.3	80	0	54	0	7.6	1.7
RYN	343	1	44	1.5	0.7	335	0	43	0	5.9	0.0
RZO	58	3	3	1.8	0.3	57	0	0	0	7.8	1.1
SAA	267	1	3	2.0	0.0	264	0	4	0	9.4	0.6
SAB	116	3	11	1.8	-0.1	115	0	6	0	7.6	0.1
SAS	1693	0	2	1.6	-0.3	1663	0	3	0	7.8	0.5
SCX	35	43	69	1.3	0.4	33	0	42	0	6.7	-2.6
SED	24	0	13	2.4	-1.3	22	0	9	0	7.9	0.6
SEU	120	3	19	2.2	1.6	108	0	12	0	8.3	1.2
SIA	1069	1	7	1.8	-0.5	1065	0	8	0	9.5	0.2
SLR	221	2	15	1.9	-0.3	224	0	13	0	9.8	0.8
SOL	53	0	6	1.2	0.8	50	0	6	0	5.8	0.3
SVA	117	3	13	2.0	-0.5	116	0	8	0	9.2	-0.1
SVV	33	0	33	5.4	4.7	35	0	3	0	11.1	0.6
SWR	112	0	25	2.2	0.2	94	0	10	0	7.8	1.6
TAP	460	1	8	1.8	-0.2	453	0	8	0	9.4	1.4
TCO	31	0	3	1.6	-0.6	31	3	6	0	6.9	0.0

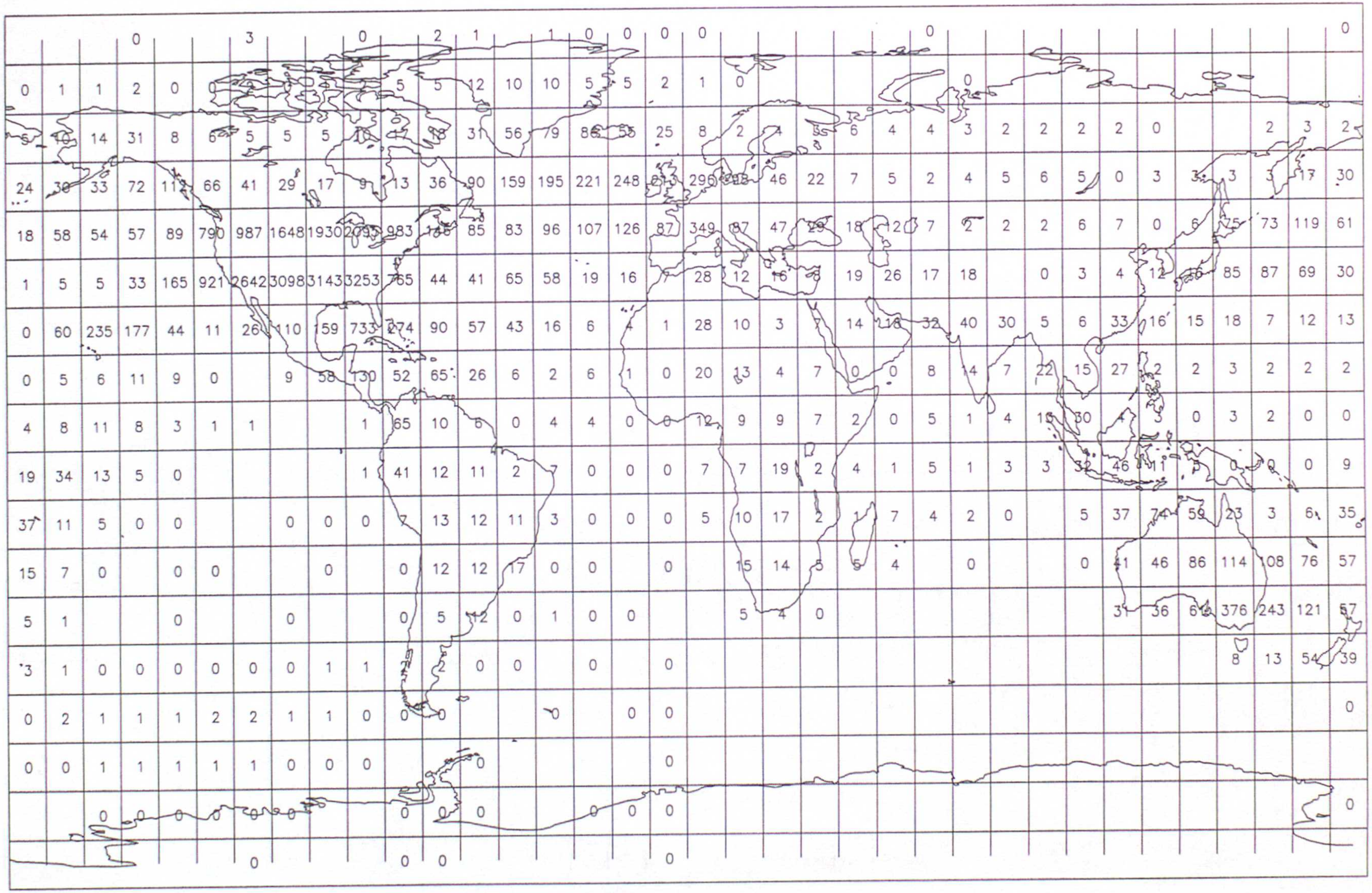
	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
THA	422	0	9	2.3	-0.5	413	1	9	0	9.9	0.8
THT	64	0	25	2.1	1.0	64	2	28	0	9.1	0.6
TOW	155	0	34	2.1	0.2	118	0	19	0	10.6	1.3
TPA	27	0	19	0.9	0.2	24	0	4	0	7.8	1.7
TSC	30	0	23	2.4	1.5	23	0	9	0	7.5	1.5
TWA	1731	1	35	2.0	0.4	1350	0	24	0	8.6	1.3
UAL	101649	0	81	1.5	-0.2	101789	0	81	0	6.6	0.5
UPS	1467	1	40	1.6	0.3	1342	0	37	0	7.7	0.7
USA	327	1	29	2.0	-0.3	252	0	17	0	8.7	2.1
VIR	361	1	17	2.2	-0.4	317	0	10	0	8.4	1.0
VKG	83	4	23	1.7	0.3	77	0	16	0	10.2	0.2
VRG	98	6	30	3.1	1.4	100	1	100	0	15.3	0.1
VVR	44	9	32	2.0	0.5	50	0	30	0	6.4	-0.7
WOA	134	0	10	1.9	0.5	127	0	34	0	9.2	1.3
ZKN	3324	0	7	1.6	0.1	3324	0	7	0	10.2	-0.4
AN	24485	0	1	1.3	0.2	24485	0	1	0	6.5	0.8
AR	3356	1	100	3.1	2.8	3345	0	30	0	6.6	1.7
BA	36081	0	1	1.4	0.2	36011	0	1	0	5.7	0.5
IT	358	0	65	0.8	0.2	355	0	65	0	5.9	1.0
KL	10512	0	5	1.7	1.0	10494	0	5	0	6.4	0.9
LH	502	0	1	1.8	1.1	540	0	2	0	6.8	0.7
MK	2264	0	0	2.1	1.7	2254	0	0	0	6.9	0.5
QF	21749	0	6	1.3	0.4	21740	0	6	0	6.5	0.6
SA	3690	0	0	1.7	1.1	3688	0	0	0	6.9	0.8
SK	384	0	7	1.1	-0.4	384	0	0	0	4.8	0.4
SV	1718	2	3	2.1	1.3	1702	0	61	0	8.2	1.3
UA	1810	2	19	1.8	0.1	1931	0	18	0	8.8	1.8
WA	637	5	11	1.9	0.5	623	3	100	0	12.7	-2.4
XX	4297	1	6	1.8	0.4	4930	0	100	0	11.7	1.1
N	650	1	20	2.4	0.4	670	0	19	0	9.0	1.2
ADS	7366	0	12	1.3	0.0	7366	0	12	0	6.1	0.5
US ACARS	512911	0	14	1.5	0.2	512909	0	14	0	6.5	0.8

MEAN DAILY COUNT OF AIRCRAFT 70 – 500 HPA

MARCH 1999

OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

FIGURE 3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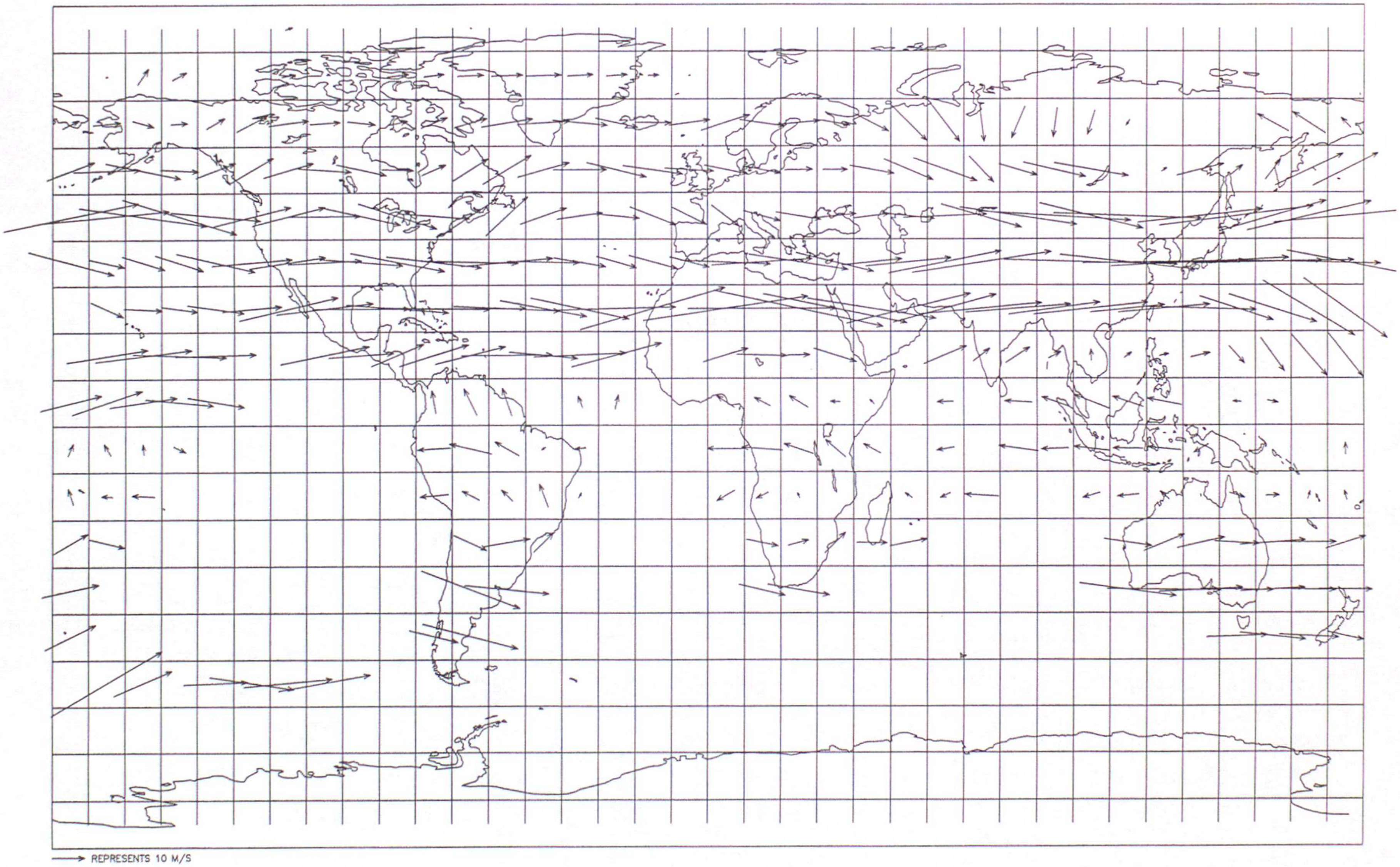
24 30 33 72 112 66 41 29 17 9 13 36 90 159 195 221 248 213 296 298 46 22 7 5 2 4 5 6 5 0 3 3 3 3 17 30
18 58 54 57 89 790 987 1648 1930 2095 983 146 85 83 96 107 126 87 349 87 47 29 18 12 7 2 2 2 6 7 0 6 75 73 119 61
1 5 5 33 165 921 2642 3098 3143 3253 765 44 41 65 58 19 16 7 28 12 16 8 19 26 17 18 0 3 4 12 36 85 87 69 30
0 60 235 177 44 11 26 110 159 733 274 90 57 43 16 6 4 1 28 10 3 7 14 18 32 40 30 5 6 33 16 15 18 7 12 13
0 5 6 11 9 0 9 58 130 52 65 26 6 2 6 1 0 20 13 4 7 0 0 8 14 7 22 15 27 2 2 3 2 2 2
4 8 11 8 3 1 1 1 65 10 6 0 4 4 0 0 12 9 9 7 2 0 5 1 4 15 30 4 3 0 3 2 0 0
19 34 13 5 0 1 41 12 11 2 7 0 0 0 7 7 19 2 4 1 5 1 3 3 32 46 11 3 0 0 0 9
37 11 5 0 0 0 0 0 7 13 12 11 3 0 0 0 5 10 17 2 1 7 4 2 0 5 37 74 59 23 3 6 35
15 7 0 0 0 0 0 12 12 17 0 0 0 15 14 5 5 4 0 0 41 46 86 114 108 76 57
5 1 0 0 0 5 12 0 1 0 0 5 4 0 31 36 61 376 243 121 57
3 1 0 0 0 0 0 0 1 1 2 2 0 0 0 0 8 13 54 39
0 2 1 1 1 2 2 1 1 0 0 0 0 0 0 0
0 0 1 1 1 1 1 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0

AIRCRAFT MEAN WINDS BETWEEN 70 AND 500 HPA FIGURE 4

MARCH 1999

OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT



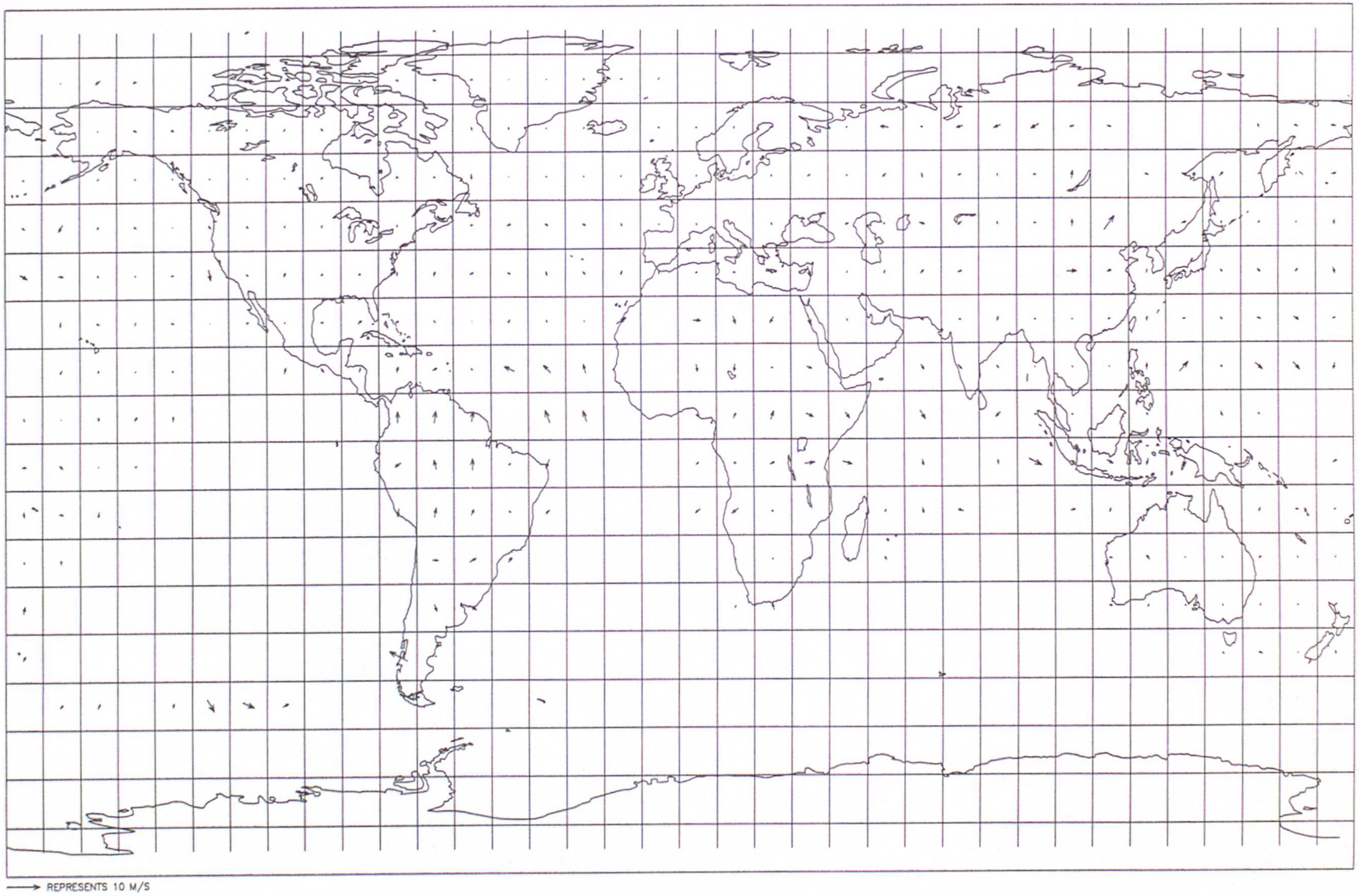
AIRCRAFT MEAN O–B WINDS BETWEEN 70 AND 500 HPA

FIGURE 5

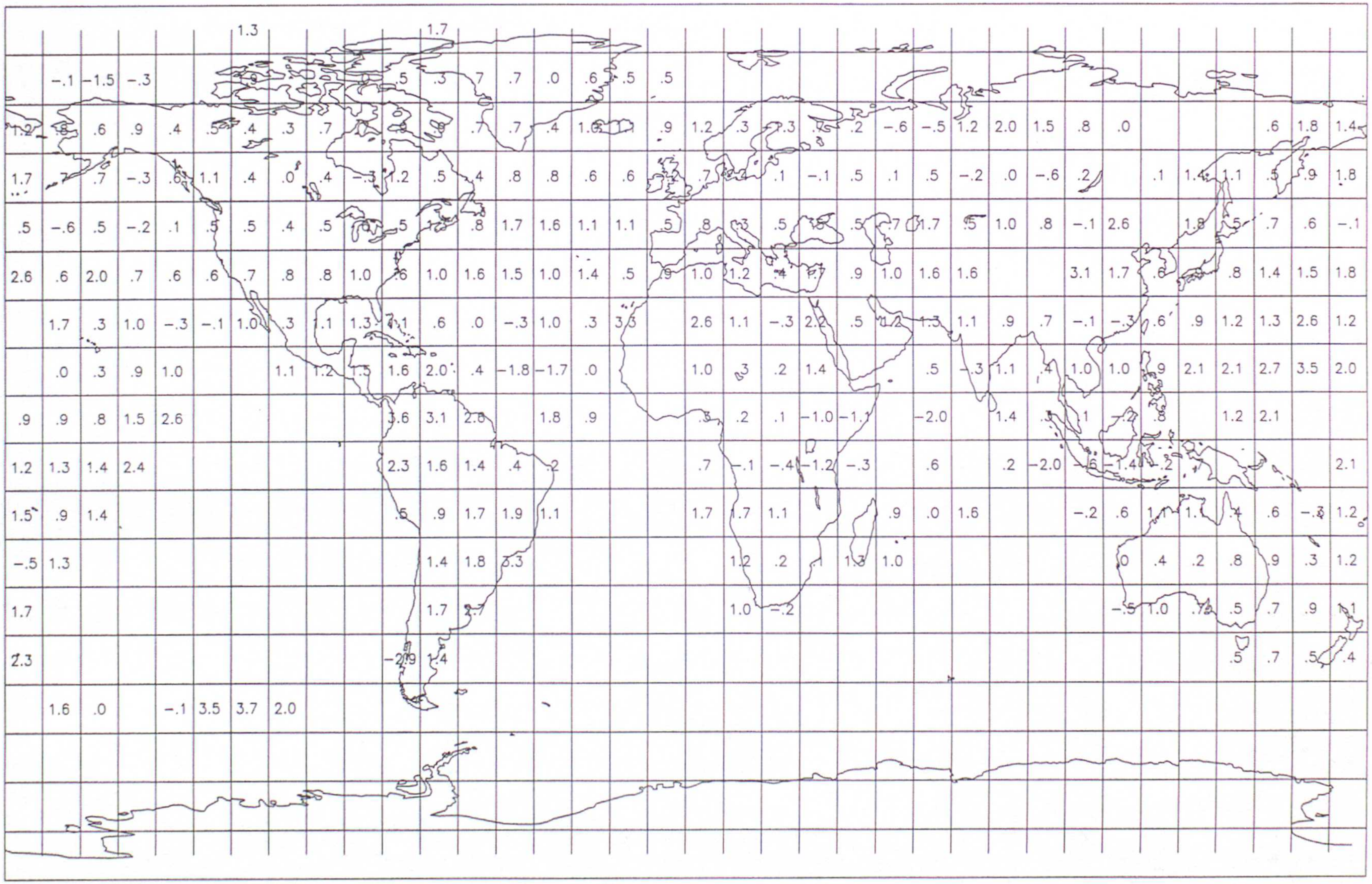
MARCH 1999

OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT



AIRCRAFT : MEAN O-B SPEEDS (M/S) BETWEEN 70 AND 500 HPA FIGURE 6
MARCH 1999
OBSERVATIONS WITH O-B VECTOR DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT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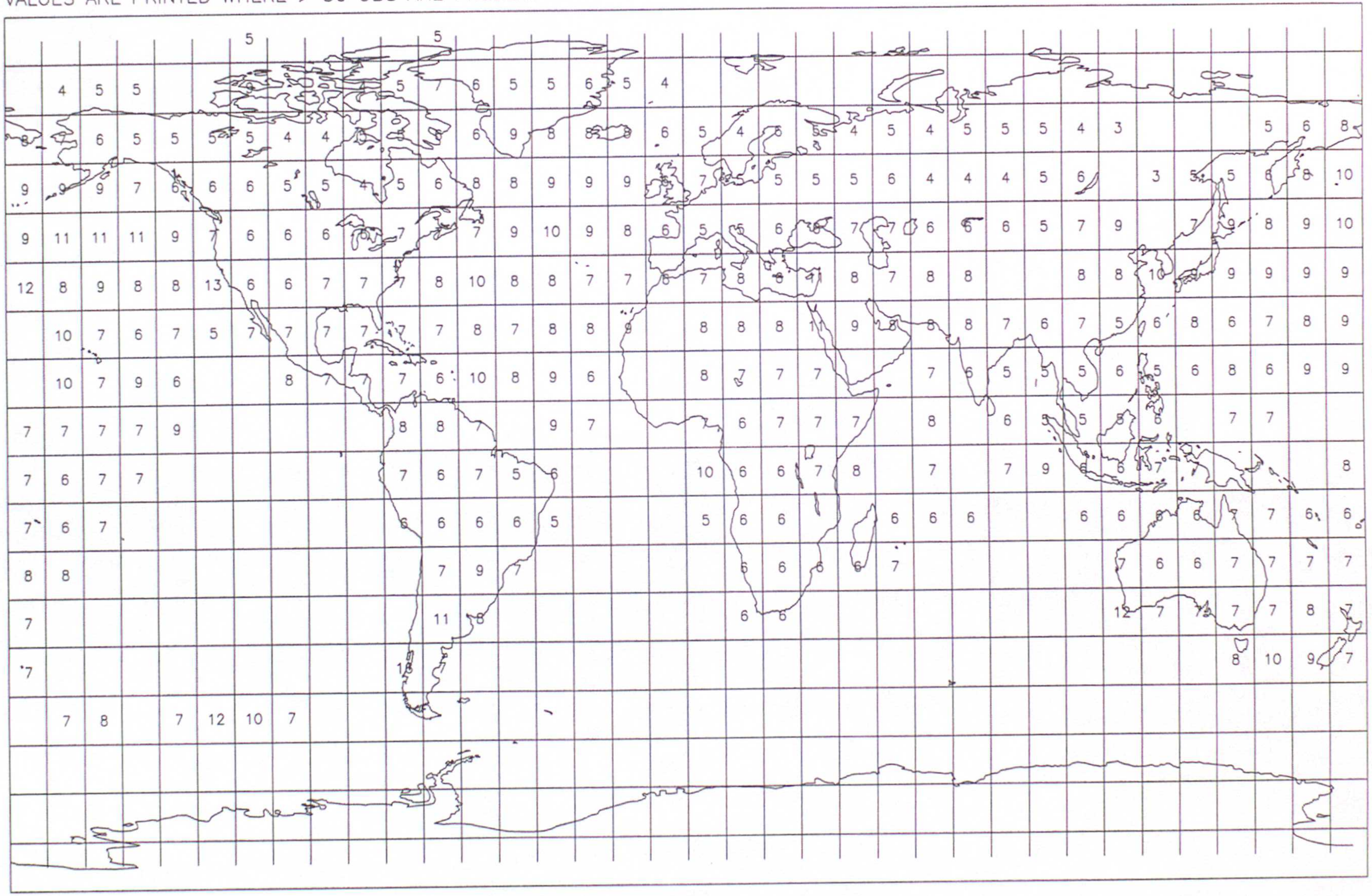
-.1 -1.5 -.3 .5 .3 .7 .7 .0 .6 .5 .5
1.2 .8 .6 .9 .4 .5 .4 .3 .7 .7 .7 .4 1.6 1.1 .9 1.2 .3 1.3 .2 -.6 -.5 1.2 2.0 1.5 .8 .0 .6 1.8 1.4
1.7 .7 .7 -.3 .6 1.1 .4 .0 .4 -.3 1.2 .5 .4 .8 .8 .6 .6 .7 .1 -.1 .5 .1 .5 -.2 .0 -.6 .2 .1 1.4 1.1 .5 .9 1.8
.5 -.6 .5 -.2 .1 .5 .5 .4 .5 .5 .8 1.7 1.6 1.1 1.1 .5 .8 .3 .5 .5 .7 1.7 .5 1.0 .8 -.1 2.6 1.8 .5 .7 .6 -.1
2.6 .6 2.0 .7 .6 .6 .7 .8 .8 1.0 .6 1.0 1.6 1.5 1.0 1.4 .5 .9 1.0 1.2 .4 1.7 .9 1.0 1.6 1.6 3.1 1.7 .6 .8 1.4 1.5 1.8
1.7 .3 1.0 -.3 -.1 1.0 .3 1.1 1.3 1.1 .6 .0 -.3 1.0 .3 3.3 2.6 1.1 -.3 2.2 .5 1.2 1.3 1.1 .9 .7 -.1 -.3 .6 .9 1.2 1.3 2.6 1.2
.0 .3 .9 1.0 1.1 1.2 1.5 1.6 2.0 .4 -1.8 -1.7 .0 1.0 .3 .2 1.4 .5 -.3 1.1 .4 1.0 1.0 .9 2.1 2.1 2.7 3.5 2.0
.9 .9 .8 1.5 2.6 3.6 3.1 2.8 1.8 .9 .3 .2 .1 -1.0 -1.1 -2.0 1.4 .3 .1 -.2 .8 1.2 2.1
1.2 1.3 1.4 2.4 2.3 1.6 1.4 .4 .2 .7 -.1 -.4 -1.2 -.3 .6 .2 -2.0 -.6 -1.4 -.2 2.1
1.5 .9 1.4 .5 .9 1.7 1.9 1.1 1.7 1.7 1.1 .9 .0 1.6 -.2 .6 1.1 1.1 .4 .6 -.3 1.2
-.5 1.3 1.4 1.8 3.3 1.2 .2 .1 1.3 1.0 .0 .4 .2 .8 .9 .3 1.2
1.7 1.7 2.7 1.0 -.2 -.5 1.0 .7 .5 .7 .9 1.1
2.3 -2.9 1.4 .5 .7 .5 .4
1.6 .0 -.1 3.5 3.7 2.0

AIRCRAFT : RMS O–B VECTOR (M/S) BETWEEN 70 AND 500 HPA FIGURE 7
MARCH 1999
OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT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9 11 11 11 9 7 6 6 6 7 7 9 10 9 8 6 5 5 6 6 7 7 6 6 6 5 7 9 7 9 8 9 10
12 8 9 8 8 13 6 6 7 7 7 8 10 8 8 7 7 6 7 8 6 11 8 7 8 8 8 8 10 9 9 9 9
10 7 6 7 5 7 7 7 7 7 8 7 8 8 9 8 8 8 1 9 8 8 8 7 6 7 5 6 8 6 7 8 9
10 7 9 6 8 7 7 6 10 8 9 6 8 7 7 7 7 6 5 5 5 6 5 6 8 6 9 9
7 7 7 7 9 8 8 7 9 7 6 7 7 7 8 6 5 5 6 7 7
7 6 7 7 7 6 7 5 6 10 6 6 7 8 7 7 9 6 6 7 8
7 6 7 6 6 6 6 5 5 6 6 6 6 6 6 6 6 6 7 6 6
8 8 7 9 7 6 6 6 6 7 7 6 6 7 7 7 7
7 11 8 6 6 12 7 7 7 7 8 7
7 13 8 10 9 7
7 8 7 12 10 7

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from Bracknell global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown duringperiod.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	: ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

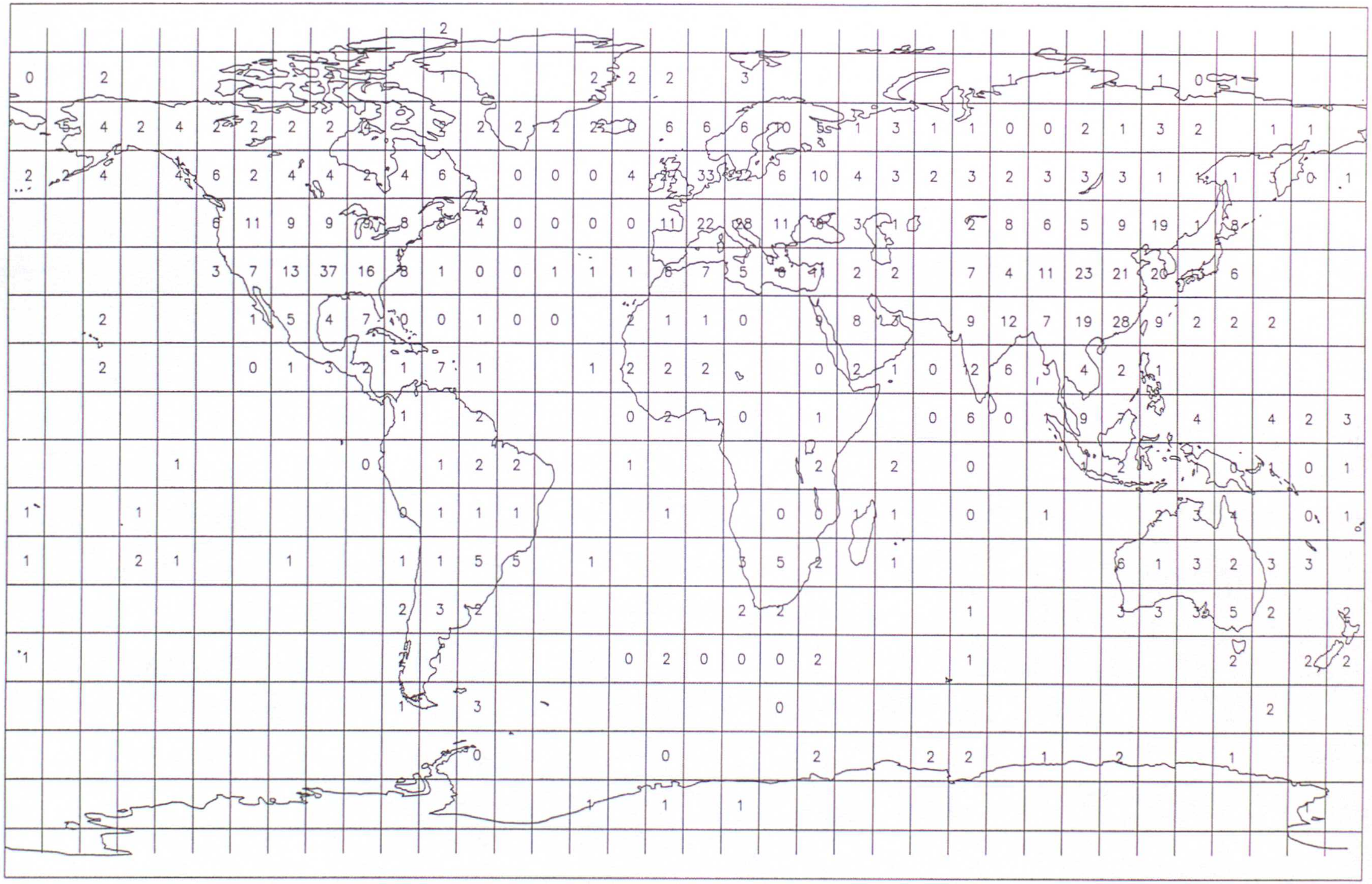
WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
17351	12	Z	1000	37/ 35	28	0	9.7	-32.1	33.5	4
26477	12	Z	100	56/ 31	15	1	51.4	106.5	118.3	5
33658	00	Z	100	48/ 26	11	0	23.0	123.2	125.3	4
33946	00	Z	50	45/ 34	11	0	24.8	195.7	197.3	6
42027	00	Z	200	34/ 75	11	0	76.7	-68.1	102.6	5
42027	12	Z	250	34/ 75	11	2	92.1	-31.9	97.5	6
42101	00	Z	200	30/ 76	23	0	74.5	-124.0	144.7	7
42101	12	Z	150	30/ 76	15	0	57.7	-85.6	103.2	6
42314	12	Z	400	27/ 95	12	0	47.1	-54.8	72.2	4
42339	12	Z	150	26/ 73	13	0	95.5	36.1	102.1	4
42361	12	Z	100	26/ 78	18	0	114.4	0.6	114.4	4
42369	12	Z	100	27/ 81	11	0	129.4	27.5	132.3	7
42397	00	Z	400	27/ 88	23	1	52.2	-43.5	67.9	7
42647	00	Z	200	23/ 73	22	0	58.0	-60.0	83.5	4
42667	12	Z	150	23/ 77	15	0	93.4	77.2	121.2	4
42701	12	Z	200	23/ 85	17	0	83.9	-17.1	85.6	5
42867	00	Z	100	21/ 79	22	1	84.2	-65.3	106.6	4
43003	12	Z	100	19/ 73	13	2	48.1	124.4	133.4	5
43014	00	Z	150	20/ 75	10	0	77.6	-97.2	124.4	5
43150	00	Z	1000	18/ 83	28	0	5.3	-33.3	33.7	5
43185	00	Z	150	16/ 81	25	0	104.8	-24.3	107.5	5
43185	12	Z	150	16/ 81	13	0	99.3	56.2	114.1	5
43192	00	Z	100	15/ 74	23	0	104.2	-92.9	139.6	4
43295	12	Z	200	13/ 78	22	1	80.0	84.2	116.2	6
43369	00	Z	100	8/ 73	16	1	53.9	-167.7	176.1	6
43369	12	Z	100	8/ 73	17	0	128.8	-1.8	128.8	4
56985	12	Z	100	23/ 103	27	0	34.1	127.0	131.5	4
82824	12	Z	1000	-9/ -64	24	0	29.4	-14.5	32.8	4
87418	12	Z	850	-33/ -69	24	0	8.7	-47.7	48.5	4
89512	00	Z	1000	-71/ 12	12	15	12.0	90.4	91.2	10
97560	00	Z	400	-1/ 136	18	0	24.6	-54.6	59.8	7

AVAILABILITY – TEMP – 500 HPA GEOPOTENTIAL – MARCH 1999 FIGURE 8

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1095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6 11 9 9 8 8 4 0 0 0 0 11 22 28 11 18 3 1 2 8 6 5 9 19 1 8
3 7 13 37 16 8 1 0 0 1 1 1 6 7 5 8 41 2 2 7 4 11 23 21 20 6
2 1 5 4 7 0 0 1 0 0 2 1 1 0 9 8 3 9 12 7 19 28 9 2 2 2
2 0 1 3 2 1 7 1 1 2 2 2 0 2 1 0 12 6 3 4 2 1
1 2 0 2 0 1 0 6 0 1 9 7 4 4 2 3
1 0 1 2 2 1 2 2 0 1 2 0 1 0 1
1 1 0 1 1 1 1 0 0 1 1 0 1 2 3 4 0 1
1 2 1 1 1 1 5 5 1 3 5 2 1 6 1 3 2 3 3
2 3 2 2 2 1 3 3 3 5 2 2
1 0 2 0 0 0 2 1 2 2 2
1 3 0 2
0 0 2 2 2 1 2 1
1 1 1 1

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from each unique identifier for radiosonde TEMPs.
Area monitored	:90°N - 90°S, 180°W - 180°E.
Standard of comparison	:Background field from Bracknell global model.
Observation times	:00 UTC and 12 UTC.
Level(s) monitored	:Standard levels between 1000.0 - 100.0 hPa
Element monitored	:VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS	:Number of observations available at level shown during period.
:NUM GROSS	:Number of gross errors at level shown during period.
:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
:NUM LEVELS	:Number of levels satisfying selection criteria.

GROSS ERROR LIMITS	:Defined in Appendix I.2
SELECTION CRITERIA	: $\geq$ 10 observations and $\geq$ 15 m s^{-1} RMS vector wind.

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
08301	00	V	250	40/ 3	20	0	20	-7.0	1.1	19.8	4
42182	00	V	200	29/ 77	17	0	17	7.4	-2.3	17.6	2
42182	12	V	200	29/ 77	15	2	23	-8.5	27.8	19.2	1
42339	00	V	200	26/ 73	22	0	9	8.6	-8.9	15.8	2
42410	12	V	300	26/ 92	14	0	28	-8.3	-3.4	24.4	2
47881	00	V	100	34/ 135	10	0	10	-10.2	1.0	15.3	1
51777	00	V	100	39/ 88	28	0	10	11.7	-1.4	17.3	1
53915	00	V	100	36/ 107	13	3	62	23.7	8.9	26.7	4
53915	12	V	100	36/ 107	13	0	61	20.5	1.4	25.2	5
54497	12	V	100	40/ 124	18	1	26	9.8	8.7	17.7	4
62306	00	V	150	31/ 27	20	0	10	12.3	-5.7	18.7	1
62306	12	V	150	31/ 27	13	0	15	13.2	-2.7	18.0	2
62414	00	V	150	24/ 33	21	0	0	11.3	0.9	15.6	1
78486	12	V	200	18/ -70	12	1	23	4.3	-8.2	16.0	1

FIGURE 9

AVAILABILITY – TEMP/PILOT – 300 HPA WIND – MARCH 1999
ALL HOURS
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1172

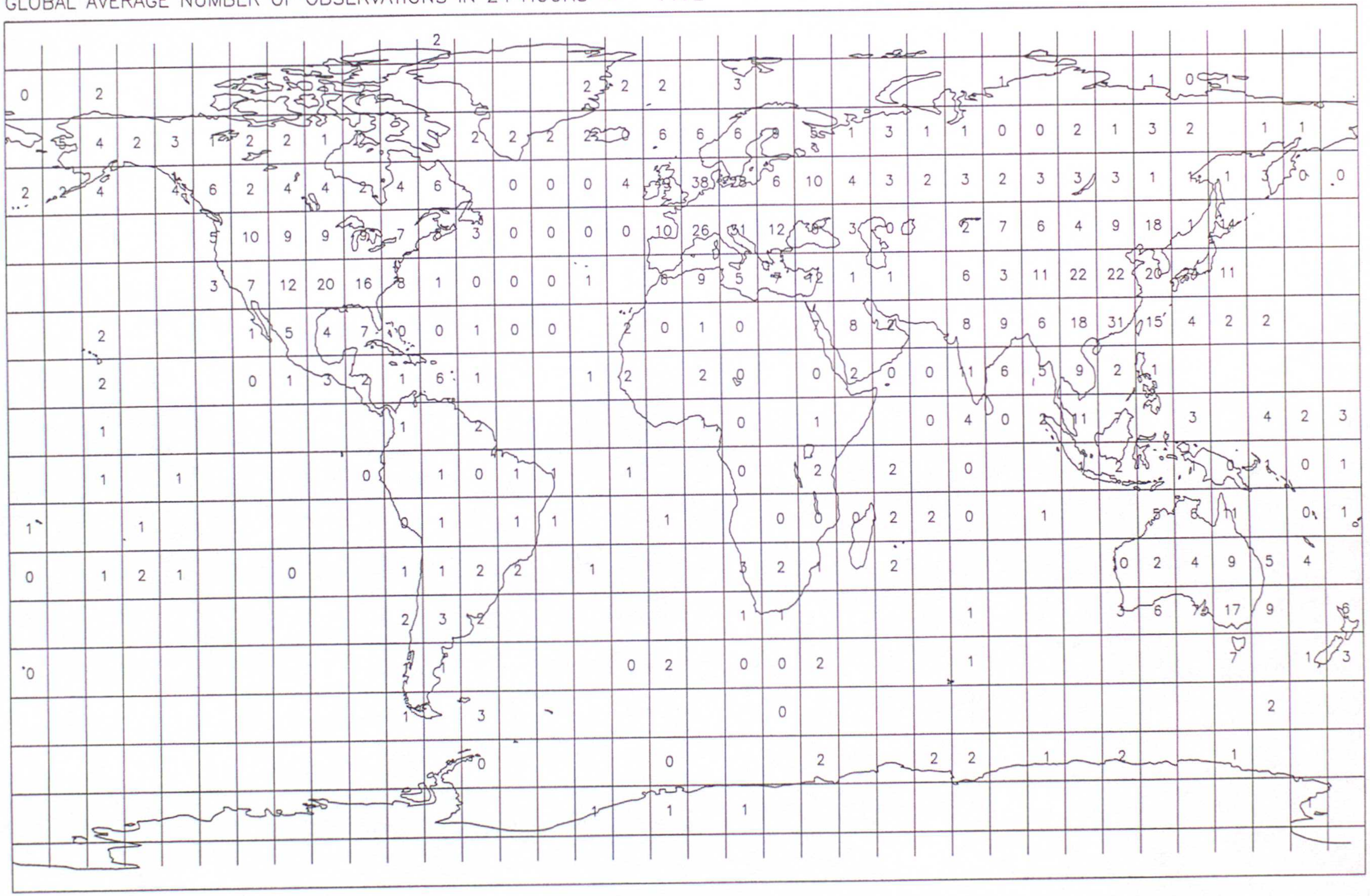


TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from Bracknell global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 500.0 - 150.0 hPa

Element monitored :WIND DIRECTION in degrees

Parameters monitored

:NUM OBS :Average number of observations at all levels.

:BIAS :Mean difference of observations from background values from all levels.

:MAX SPREAD :(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels

:SD :SD of difference of observations from background values at all levels.

SELECTION CRITERIA :NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
30554	12	DD	54/ 114	22	-10.4	4.5	13.2
33317	00	DD	50/ 27	13	-10.6	5.2	12.5
42339	00	DD	26/ 73	23	15.5	5.9	9.0
42339	12	DD	26/ 73	12	14.2	6.4	9.8
42701	12	DD	23/ 85	11	21.2	6.3	14.6
60490	12	DD	36/ -1	17	11.0	9.8	18.6
62337	12	DD	31/ 34	25	-17.0	5.4	10.3
71917	00	DD	80/ -86	13	11.6	4.7	19.3
71917	12	DD	80/ -86	14	11.4	5.3	18.0
78583	12	DD	18/ -88	20	15.1	7.0	20.1
82824	12	DD	-9/ -64	17	24.6	7.6	20.7

MONITORING OF SATELLITE WINDS

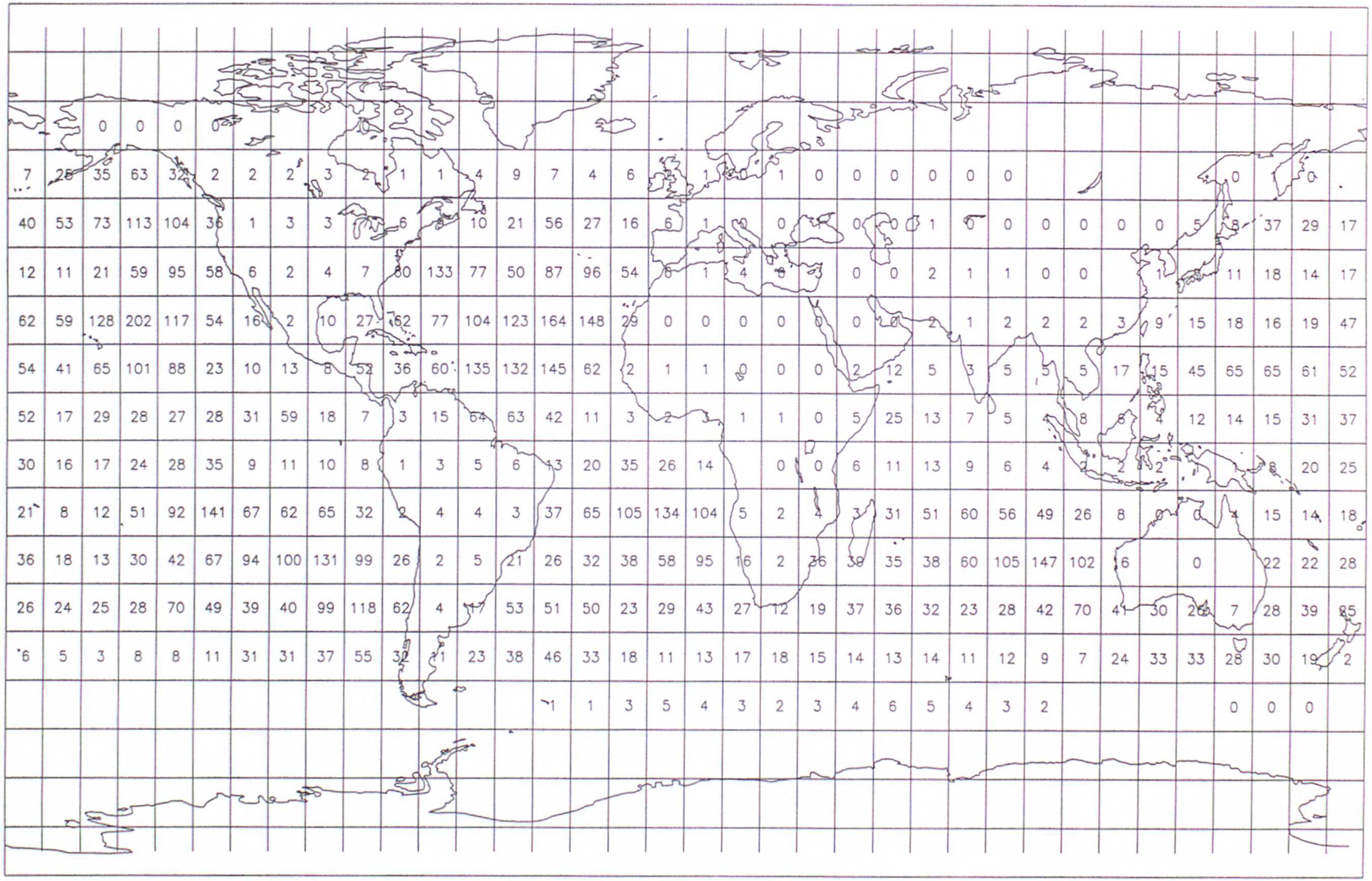
MONITORING CENTRE: BRACKNELL

MONTH: March 1999

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from GOES, METEOSAT, GMS, INSAT.
Standard of comparison	:Background field from Bracknell global model.
Selection Criteria	:number of observations > 10.
Data Extracted	:Layer 701 - 1000 hPa 401 - 700 hPa 101 - 400 hPa
	:Mean wind
	:Mean observation minus background vector wind differences
	:Mean observation minus background speed differences
	:RMS of observation minus background vector differences

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 701 AND 1000 HPA FIGURE 10
MARCH 1999



		0	0	0	0																														
7	25	35	63	32	2	2	2	3	2	1	1	4	9	7	4	6	2	1		1	0	0	0	0	0	0						0		0	
40	53	73	113	104	36	1	3	3		6	8	10	21	56	27	16	6	1	0	0	1	0	0	1	0	0	0	0	0	0	5	8	37	29	17
12	11	21	59	95	58	6	2	4	7	80	133	77	50	87	96	54	6	1	4	0	3	0	0	2	1	1	0	0		1	5	11	18	14	17
62	59	128	202	117	54	16	2	10	27	62	77	104	123	164	148	29	0	0	0	0	0	0	0	2	1	2	2	2	3	9	15	18	16	19	47
54	41	65	101	88	23	10	13	8	52	36	60	135	132	145	62	2	1	1	0	0	0	2	12	5	3	5	5	5	17	15	45	65	65	61	52
52	17	29	28	27	28	31	59	18	7	3	15	64	63	42	11	3	2	3	1	1	0	5	25	13	7	5	4	8	8	4	12	14	15	31	37
30	16	17	24	28	35	9	11	10	8	1	3	5	6	13	20	35	26	14		0	0	6	11	13	9	6	4	2	2	2			8	20	25
21	8	12	51	92	141	67	62	65	32	2	4	4	3	37	65	105	134	104	5	2	4	3	31	51	60	56	49	26	8	0	0	4	15	14	18
36	18	13	30	42	67	94	100	131	99	26	2	5	21	26	32	38	58	95	16	2	36	38	35	38	60	105	147	102	16		0		22	22	28
26	24	25	28	70	49	39	40	99	118	62	4	17	53	51	50	23	29	43	27	12	19	37	36	32	23	28	42	70	41	30	26	7	28	39	85
6	5	3	8	8	11	31	31	37	55	32	11	23	38	46	33	18	11	13	17	18	15	14	13	14	11	12	9	7	24	33	33	28	30	19	2
														1	1	3	5	4	3	2	3	4	6	5	4	3	2					0	0	0	

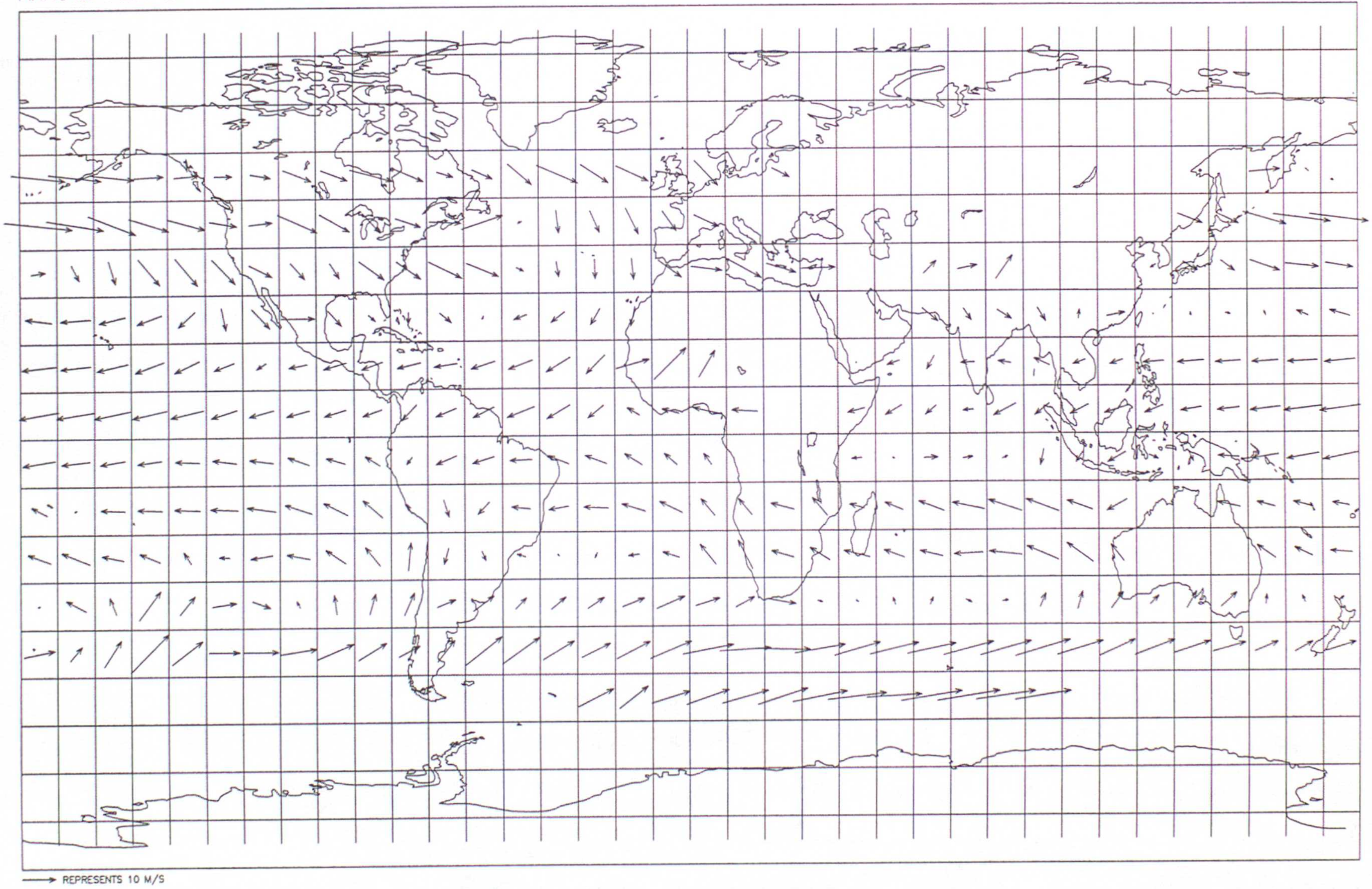
SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 701–1000 HPA

FIGURE 11

MARCH 1999

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 10 M/S

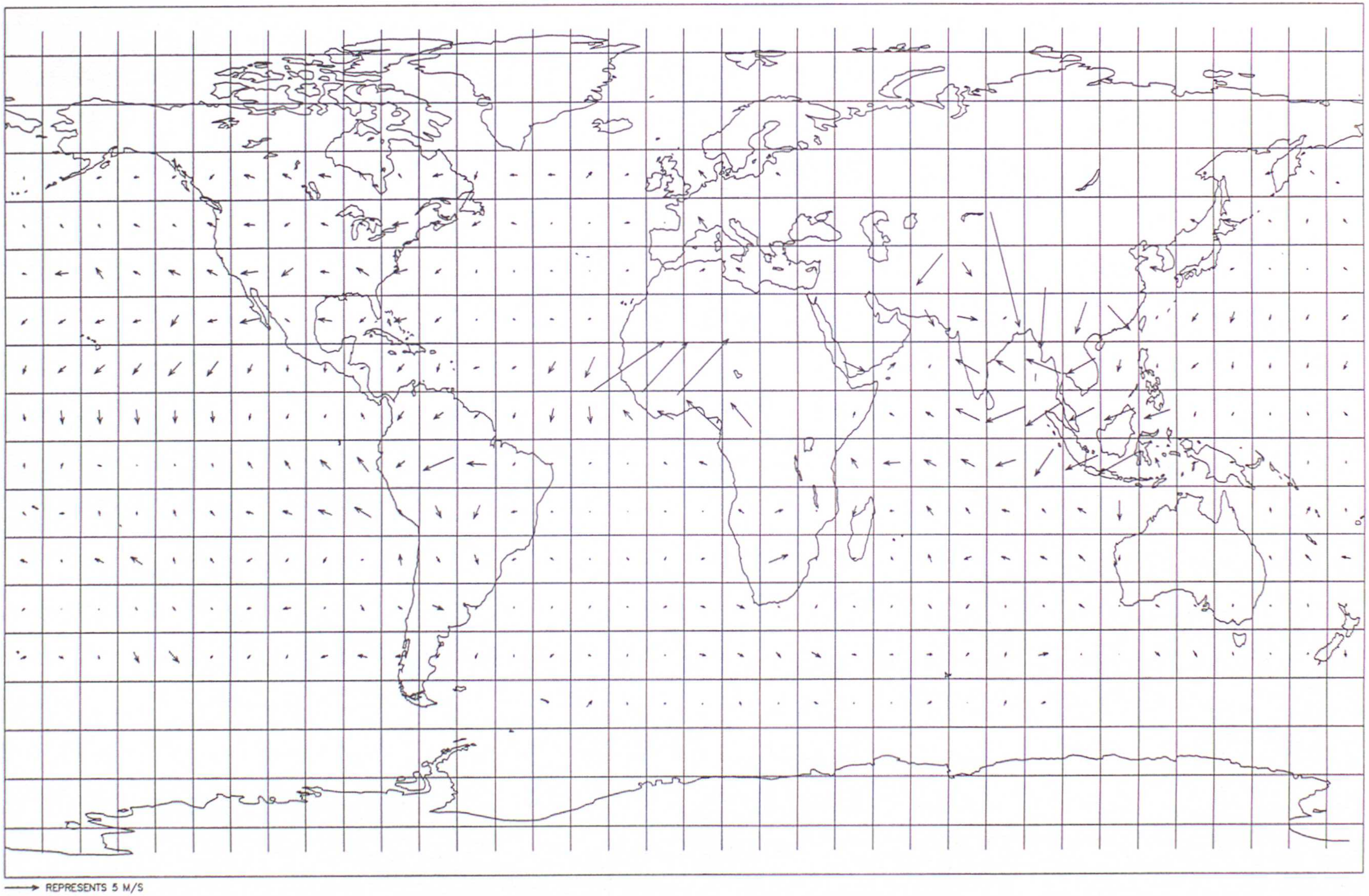
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 701–1000 HPA

FIGURE 12

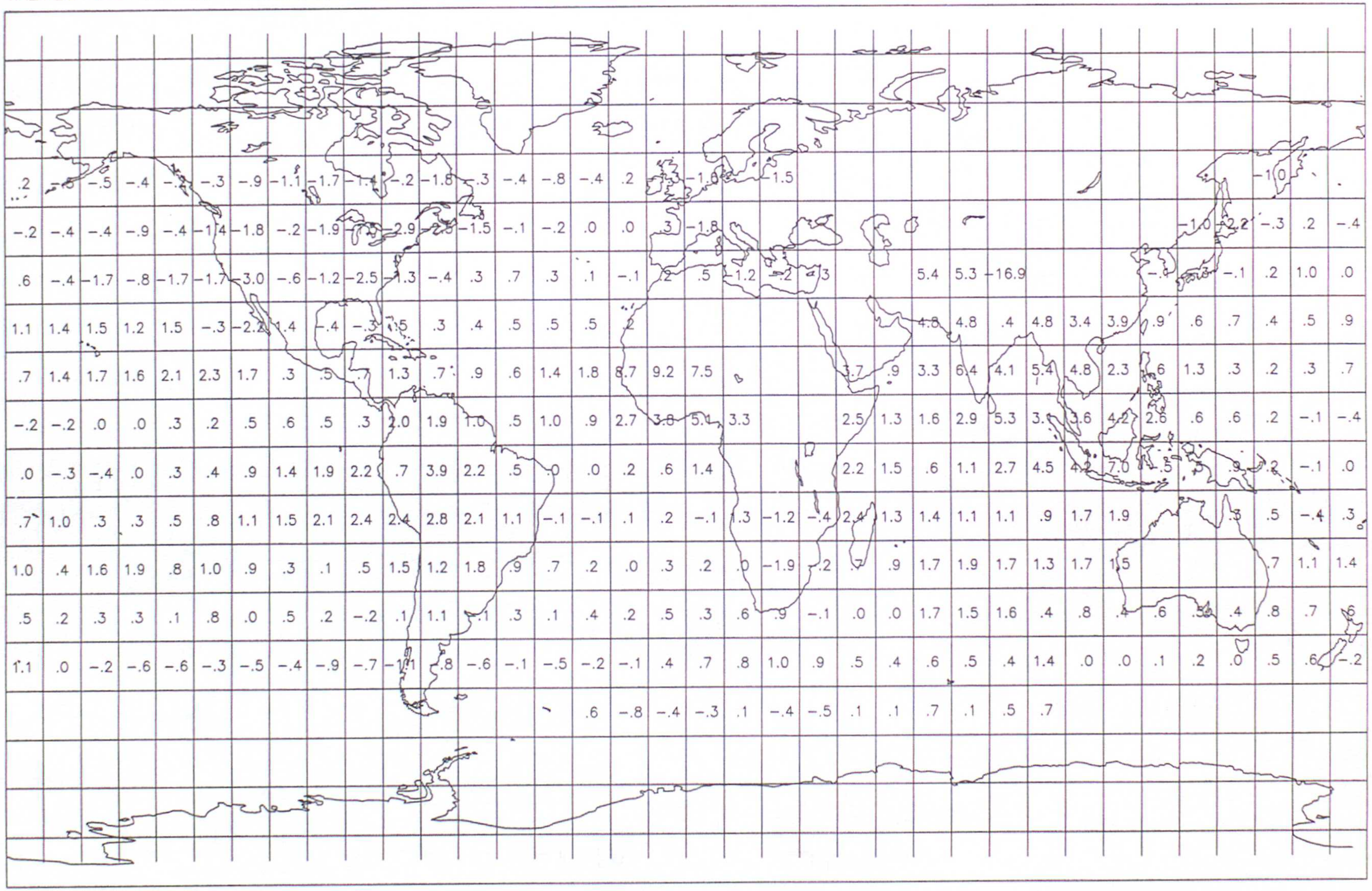
MARCH 1999

ALL OBSERVATIONS

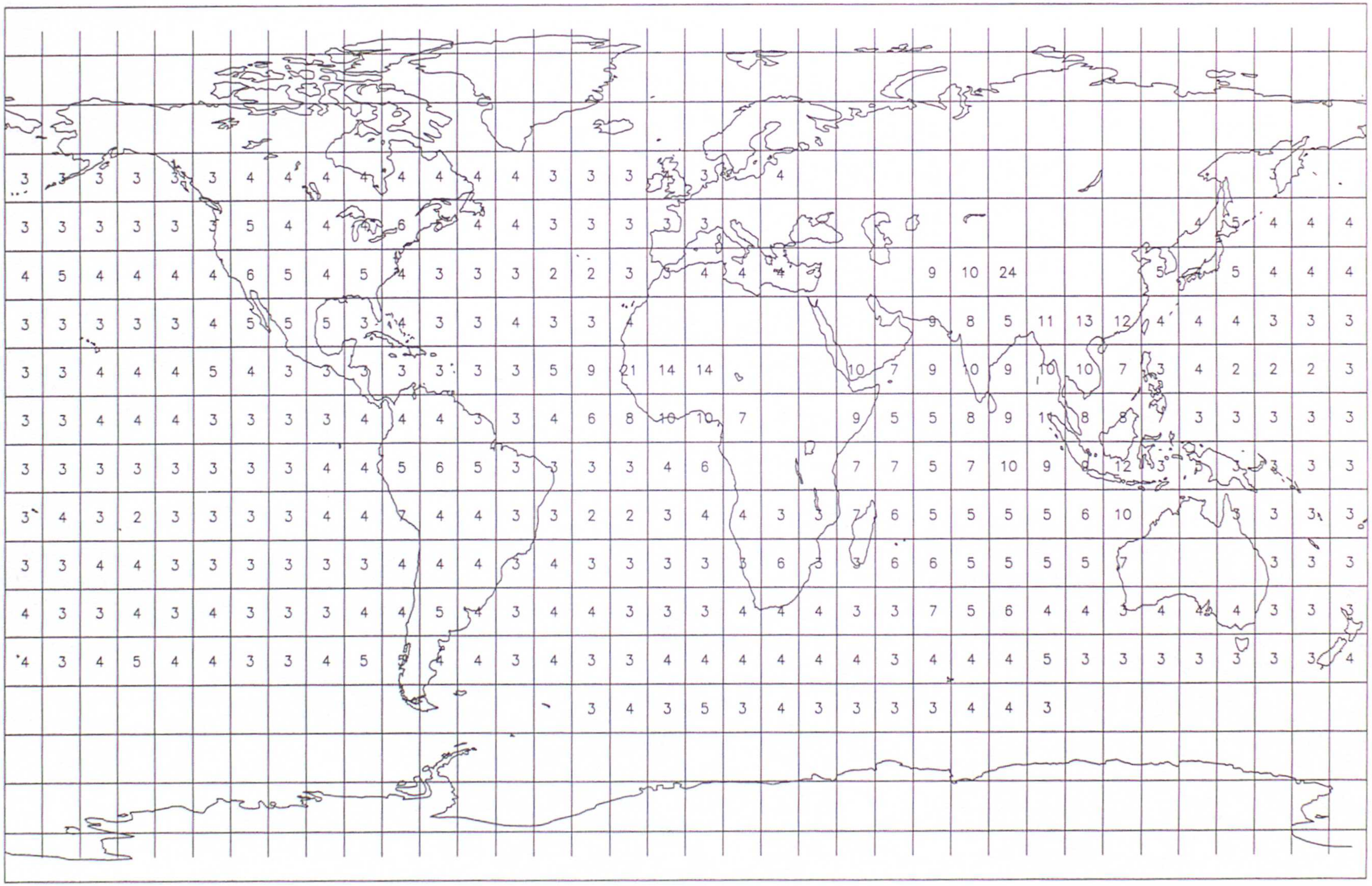
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT



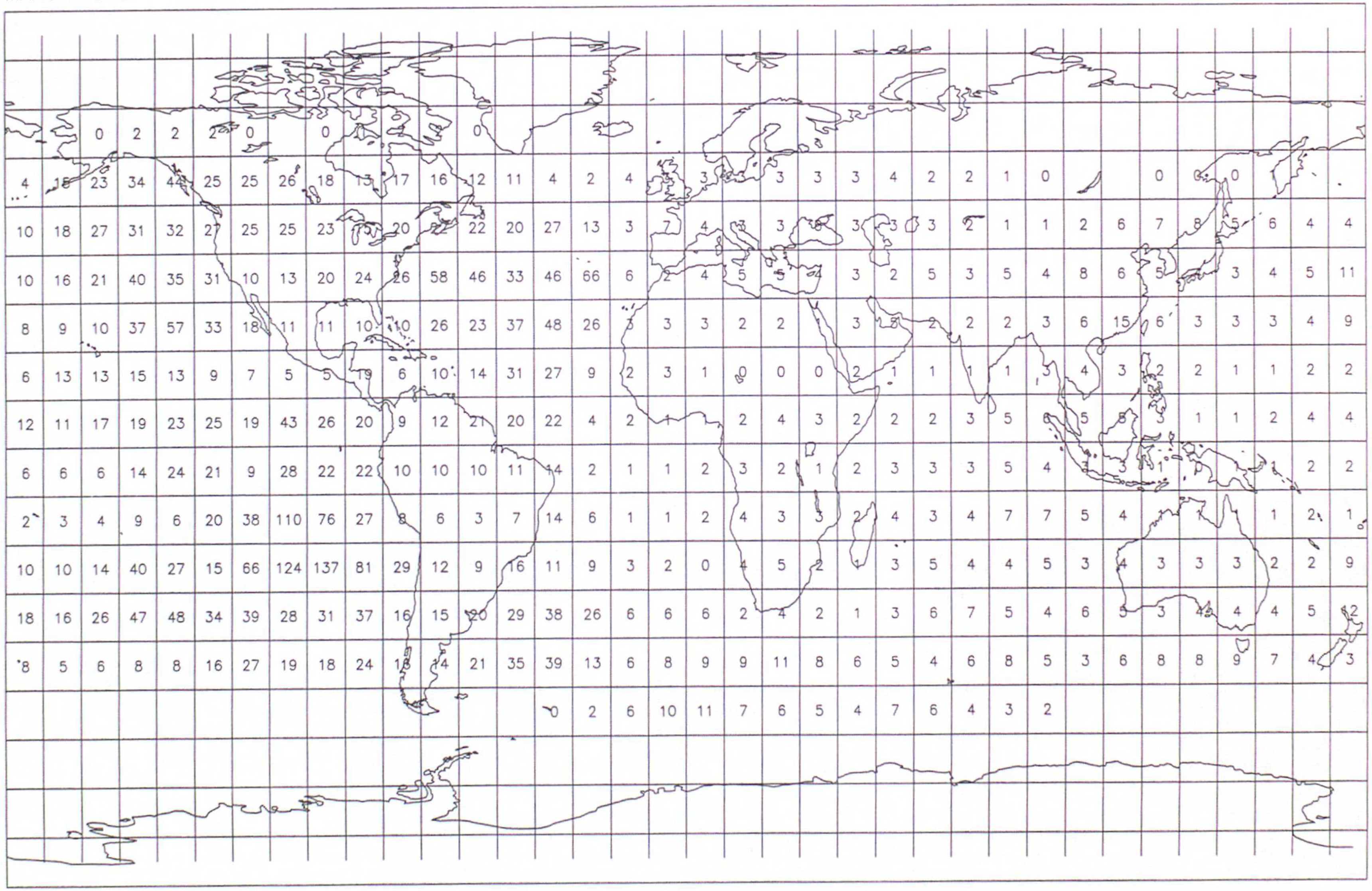
SATOBS : MEAN O–B SPEED DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 13
MARCH 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


.2 –.5 –.4 –.2 –.3 –.9 –1.1 –1.7 –1.4 –.2 –1.8 –.3 –.4 –.8 –.4 .2 –1.6 –1.5 –1.0
–.2 –.4 –.4 –.9 –.4 –1.4 –1.8 –.2 –1.9 –2.9 –2.5 –1.5 –.1 –.2 .0 .0 .3 –1.8 –1.0 –2.2 –.3 .2 –.4
.6 –.4 –1.7 –.8 –1.7 –1.7 –3.0 –.6 –1.2 –2.5 –1.3 –.4 .3 .7 .3 .1 –.1 .2 .5 –1.2 –.2 .3 5.4 5.3 –16.9 –.4 –.1 .2 1.0 .0
1.1 1.4 1.5 1.2 1.5 –.3 –2.2 1.4 –.4 –.3 .5 .3 .4 .5 .5 .5 .2 4.8 4.8 .4 4.8 3.4 3.9 .9 .6 .7 .4 .5 .9
.7 1.4 1.7 1.6 2.1 2.3 1.7 .3 .5 .7 1.3 .7 .9 .6 1.4 1.8 8.7 9.2 7.5 3.7 .9 3.3 6.4 4.1 5.4 4.8 2.3 .6 1.3 .3 .2 .3 .7
–.2 –.2 .0 .0 .3 .2 .5 .6 .5 .3 2.0 1.9 1.0 .5 1.0 .9 2.7 3.8 5.1 3.3 2.5 1.3 1.6 2.9 5.3 3.1 3.6 4.2 2.6 .6 .6 .2 –.1 –.4
.0 –.3 –.4 .0 .3 .4 .9 1.4 1.9 2.2 .7 3.9 2.2 .5 .0 .0 .2 .6 1.4 2.2 1.5 .6 1.1 2.7 4.5 4.2 7.0 .5 .5 .9 .2 –.1 .0
.7 1.0 .3 .3 .5 .8 1.1 1.5 2.1 2.4 2.4 2.8 2.1 1.1 –.1 –.1 .1 .2 –.1 1.3 –1.2 –.4 2.4 1.3 1.4 1.1 1.1 .9 1.7 1.9 .3 .5 –.4 .3
1.0 .4 1.6 1.9 .8 1.0 .9 .3 .1 .5 1.5 1.2 1.8 .9 .7 .2 .0 .3 .2 .0 –1.9 –.2 .7 .9 1.7 1.9 1.7 1.3 1.7 1.5 .7 1.1 1.4
.5 .2 .3 .3 .1 .8 .0 .5 .2 –.2 .1 1.1 –.1 .3 .1 .4 .2 .5 .3 .6 .9 –.1 .0 .0 1.7 1.5 1.6 .4 .8 .4 .6 .5 .4 .8 .7 .6
1.1 .0 –.2 –.6 –.6 –.3 –.5 –.4 –.9 –.7 –1.1 –.8 –.6 –.1 –.5 –.2 –.1 .4 .7 .8 1.0 .9 .5 .4 .6 .5 .4 1.4 .0 .0 .1 .2 .0 .5 .6 –.2
.6 –.8 –.4 –.3 .1 –.4 –.5 .1 .1 .7 .1 .5 .7

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 14
MARCH 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


3 3 3 3 3 3 4 4 4 4 4 4 4 4 3 3 3 3 4
3 3 3 3 3 3 5 4 4 4 6 4 4 3 3 3 3 3 4 5 4 4 4
4 5 4 4 4 4 6 5 4 5 4 3 3 3 2 2 3 3 4 4 4 3 9 10 24 5 5 4 4 4
3 3 3 3 3 4 5 5 5 3 4 3 3 4 3 3 4 9 8 5 11 13 12 4 4 4 3 3 3
3 3 4 4 4 5 4 3 3 3 3 3 3 3 5 9 21 14 14 10 7 9 10 9 10 10 7 3 4 2 2 2 3
3 3 4 4 4 3 3 3 3 4 4 4 3 3 4 6 8 10 10 7 9 5 5 8 9 11 8 8 7 3 3 3 3 3
3 3 3 3 3 3 3 3 4 4 5 6 5 3 3 3 3 4 6 7 7 5 7 10 9 8 12 3 3 3 3
3 4 3 2 3 3 3 3 4 4 7 4 4 3 3 2 2 3 4 4 3 3 7 6 5 5 5 5 6 10 3 3 3 3
3 3 4 4 3 3 3 3 3 3 4 4 4 3 4 3 3 3 3 3 6 3 3 6 6 5 5 5 5 7 3 3 3
4 3 3 4 3 4 3 3 3 4 4 5 4 3 4 4 3 3 3 4 4 4 3 3 7 5 6 4 4 3 4 4 4 3 3 3
4 3 4 5 4 4 3 3 4 5 4 4 3 4 3 3 4 4 4 4 4 4 3 4 4 4 5 3 3 3 3 3 3 3 4
3 4 3 5 3 4 3 3 3 3 4 4 3

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 401 AND 700 HPA FIGURE 15
MARCH 1999



		0	2	2	2	0		0				0																							
4	15	23	34	44	25	25	26	18	13	17	16	12	11	4	2	4		3	3	3	3	3	4	2	2	1	0			0	0	0			
10	18	27	31	32	27	25	25	23	15	20	22	22	20	27	13	3	7	4	3	3	8	3	3	3	2	1	1	2	6	7	8	5	6	4	4
10	16	21	40	35	31	10	13	20	24	26	58	46	33	46	66	6	2	4	5	5	4	3	2	5	3	5	4	8	6	5		3	4	5	11
8	9	10	37	57	33	18	11	11	10	10	26	23	37	48	26	3	3	3	2	2		3	3	2	2	2	3	6	15	6	3	3	3	4	9
6	13	13	15	13	9	7	5	5	19	6	10	14	31	27	9	2	3	1	0	0	0	2	1	1	1	1	3	4	3	2	2	1	1	2	2
12	11	17	19	23	25	19	43	26	20	9	12	21	20	22	4	2	1	1	2	4	3	2	2	2	3	5	6	5	8	3	1	1	2	4	4
6	6	6	14	24	21	9	28	22	22	10	10	10	11	14	2	1	1	2	3	2	1	2	3	3	3	5	4	3	3	1	0	1	1	2	2
2	3	4	9	6	20	38	110	76	27	8	6	3	7	14	6	1	1	2	4	3	3	2	4	3	4	7	7	5	4	1	1	1	1	2	1
10	10	14	40	27	15	66	124	137	81	29	12	9	16	11	9	3	2	0	4	5	2	1	3	5	4	4	5	3	4	3	3	3	2	2	9
18	16	26	47	48	34	39	28	31	37	16	15	20	29	38	26	6	6	6	2	4	2	1	3	6	7	5	4	6	5	3	4	4	4	5	12
8	5	6	8	8	16	27	19	18	24	13	14	21	35	39	13	6	8	9	9	11	8	6	5	4	6	8	5	3	6	8	8	9	7	4	3
														0	2	6	10	11	7	6	5	4	7	6	4	3	2								

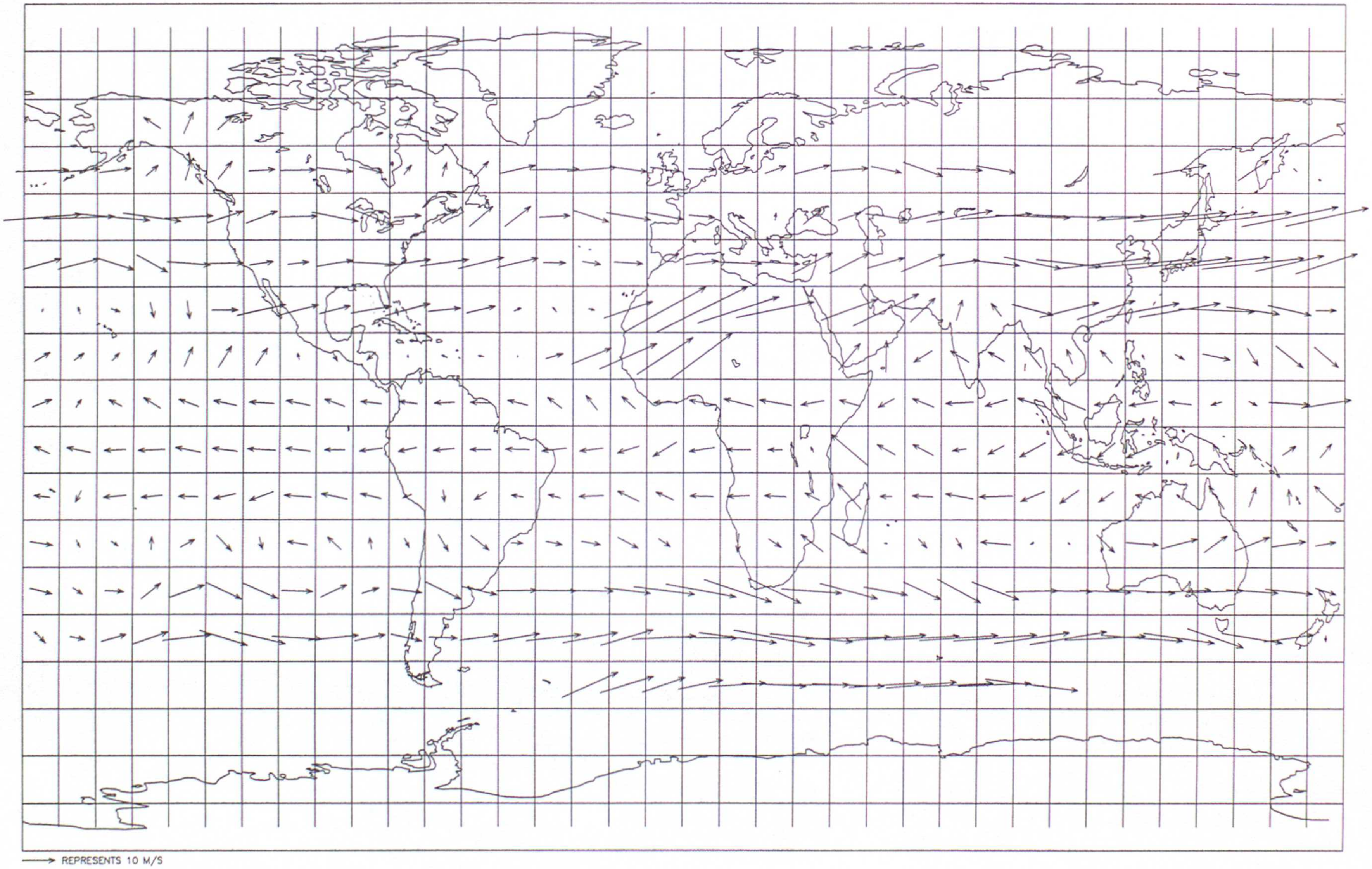
SATOB VECTOR MEAN WINDS BETWEEN 401–700 HPA

MARCH 1999

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

FIGURE 16


REPRESENTS 10 M/S

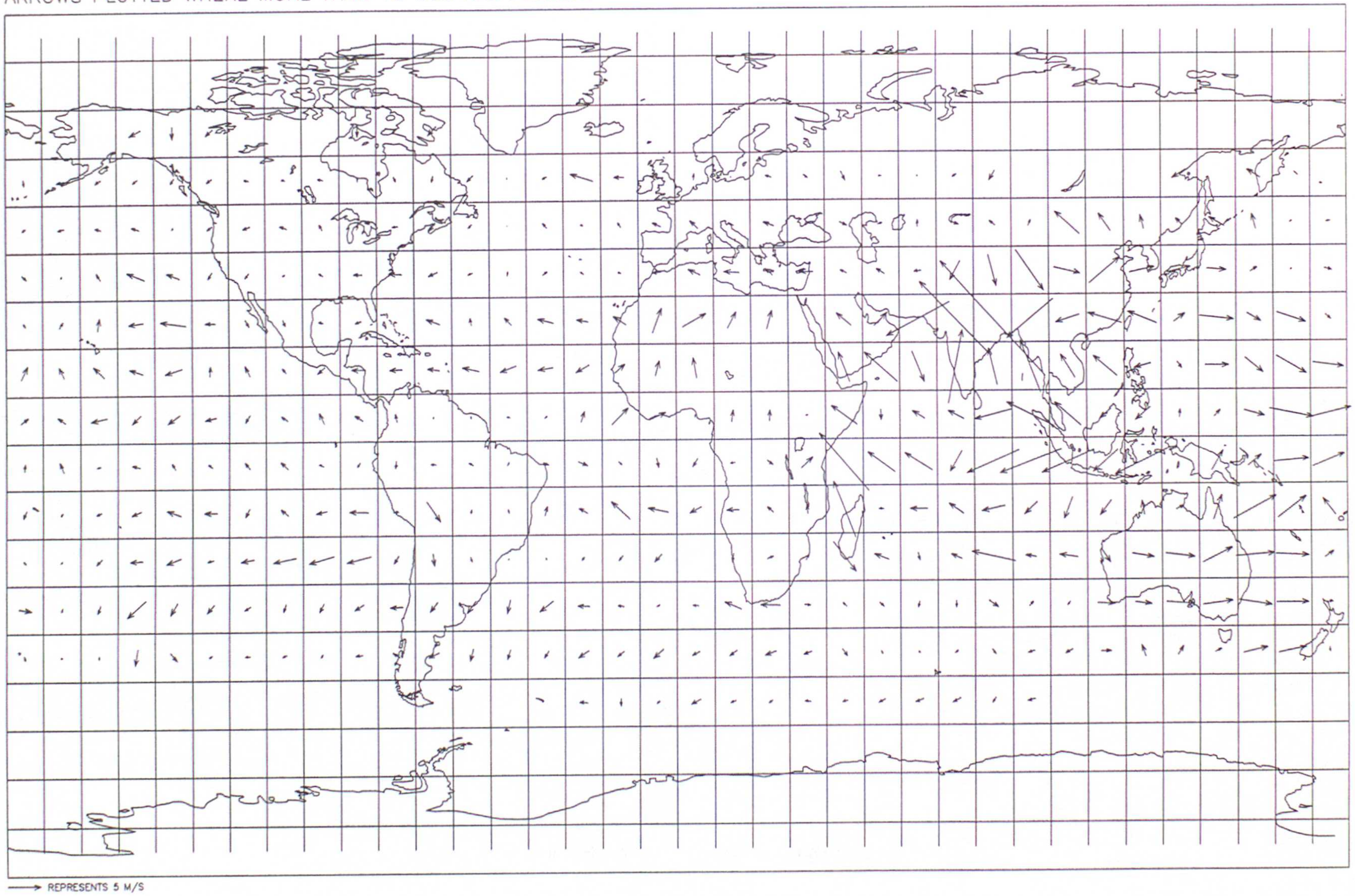
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 401-700 HPA

FIGURE 17

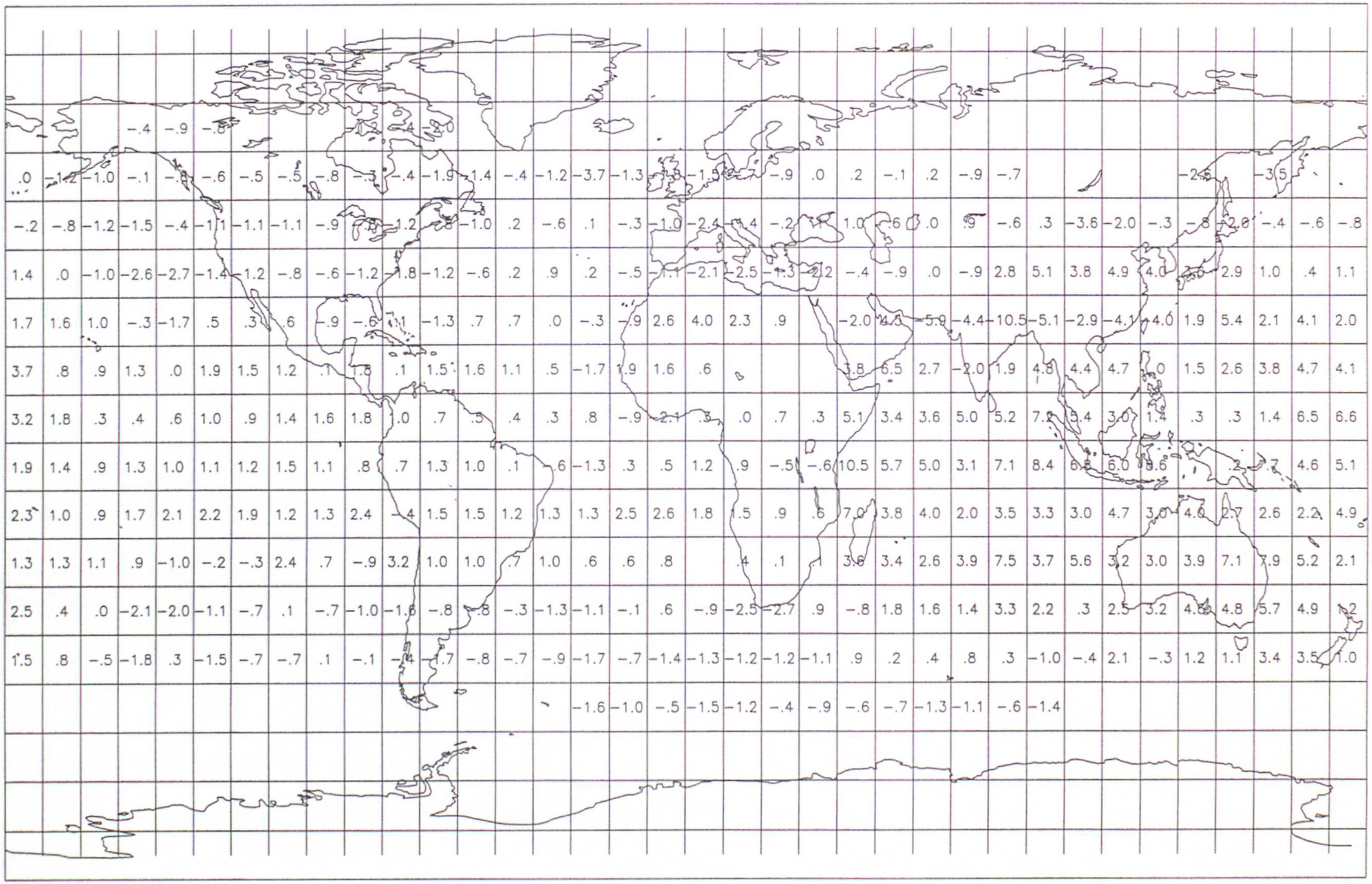
MARCH 1999

ALL OBSERVATIONS

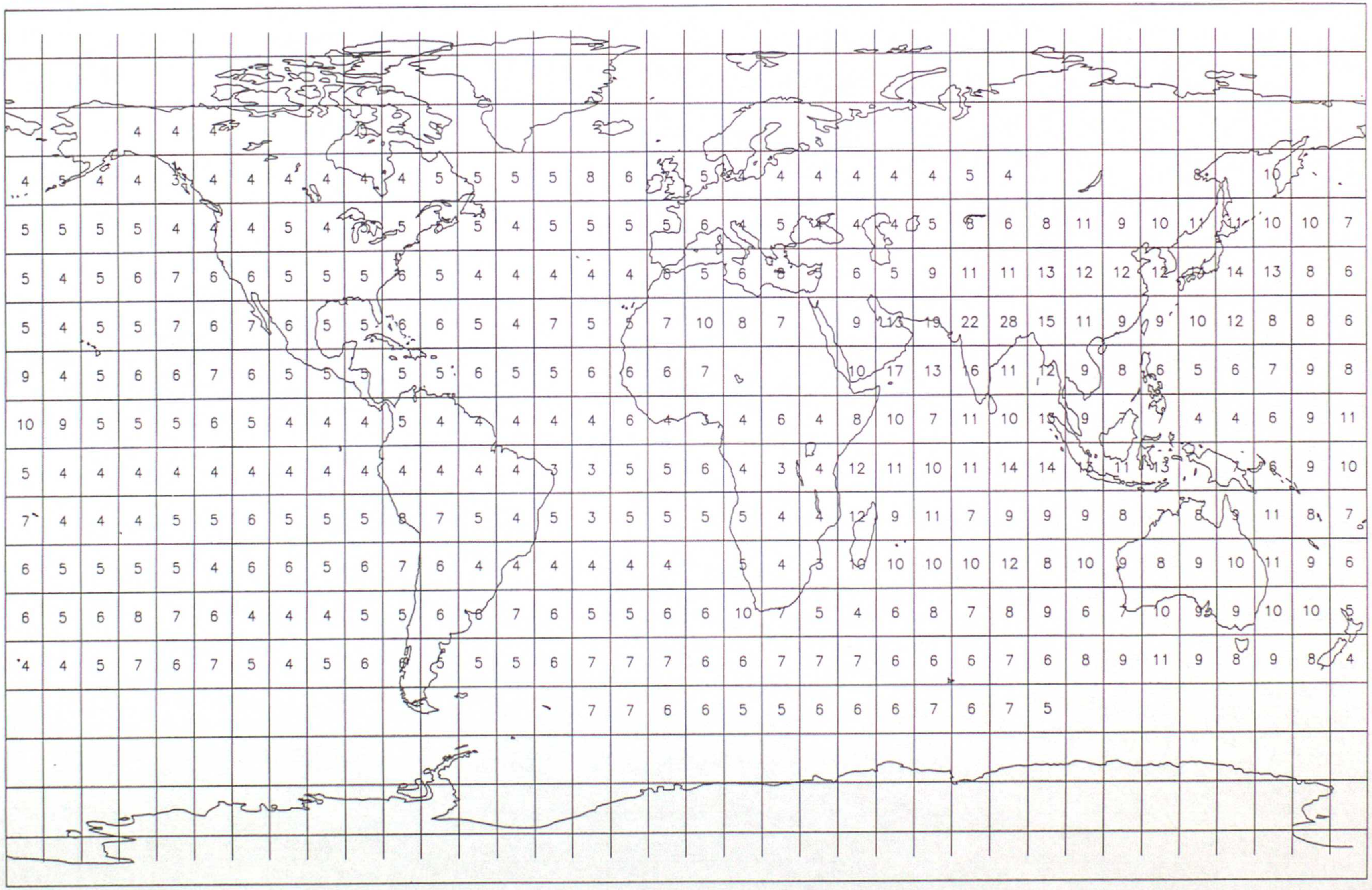
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 5 M/S

SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 18
MARCH 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT

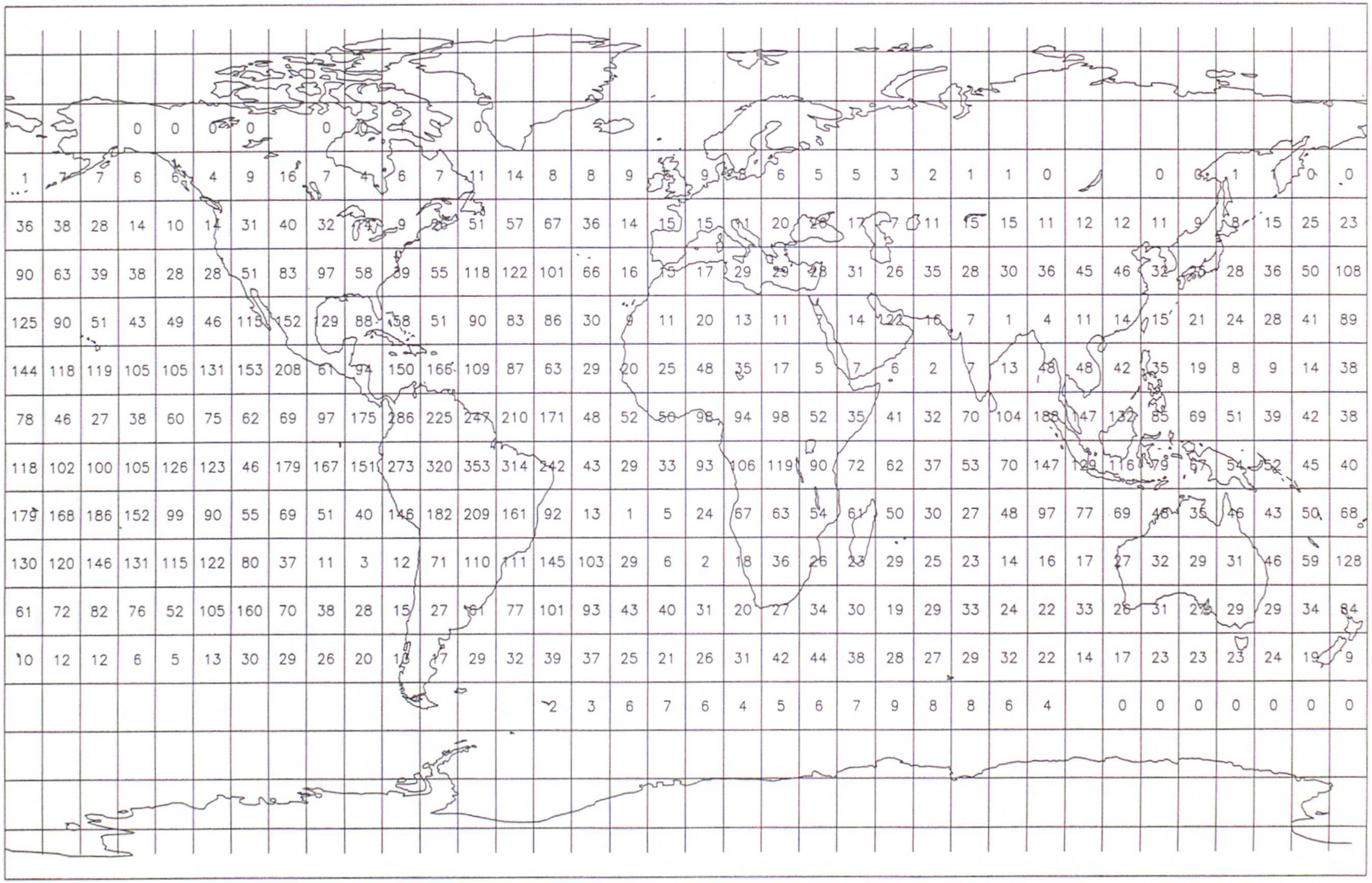

-.4 -.9 -.8 -1.2 -.4 -2.0
.0 -1.2 -1.0 -.1 -.8 -.6 -.5 -.5 -.8 -.3 -.4 -1.9 -1.4 -.4 -1.2 -3.7 -1.3 -1.8 -1.5 -.7 -.9 .0 .2 -.1 .2 -.9 -.7 -2.5 -3.5
-.2 -.8 -1.2 -1.5 -.4 -1.1 -1.1 -1.1 -.9 -.8 -1.2 -.8 -1.0 .2 -.6 .1 -.3 -1.0 -2.4 -1.4 -.2 -.1 1.0 -.6 .0 .9 -.6 .3 -3.6 -2.0 -.3 -.8 -2.0 -.4 -.6 -.8
1.4 .0 -1.0 -2.6 -2.7 -1.4 -1.2 -.8 -.6 -1.2 -1.8 -1.2 -.6 .2 .9 .2 -.5 -1.1 -2.1 -2.5 -1.3 -2.2 -.4 -.9 .0 -.9 2.8 5.1 3.8 4.9 4.0 3.6 2.9 1.0 .4 1.1
1.7 1.6 1.0 -.3 -1.7 .5 .3 .6 -.9 -.6 .1 -1.3 .7 .7 .0 -.3 -.9 2.6 4.0 2.3 .9 -2.0 4.5 -5.9 -4.4 -10.5 -5.1 -2.9 -4.1 4.0 1.9 5.4 2.1 4.1 2.0
3.7 .8 .9 1.3 .0 1.9 1.5 1.2 .1 1.8 .1 1.5 1.6 1.1 .5 -1.7 1.9 1.6 .6 3.8 6.5 2.7 -2.0 1.9 4.8 4.4 4.7 .0 1.5 2.6 3.8 4.7 4.1
3.2 1.8 .3 .4 .6 1.0 .9 1.4 1.6 1.8 1.0 .7 .5 .4 .3 .8 -.9 -2.1 .3 .0 .7 .3 5.1 3.4 3.6 5.0 5.2 7.2 5.4 3.0 1.4 .3 .3 1.4 6.5 6.6
1.9 1.4 .9 1.3 1.0 1.1 1.2 1.5 1.1 .8 .7 1.3 1.0 .1 -.6 -1.3 .3 .5 1.2 .9 -.5 -.6 10.5 5.7 5.0 3.1 7.1 8.4 6.8 6.0 8.6 .2 .7 4.6 5.1
2.3 1.0 .9 1.7 2.1 2.2 1.9 1.2 1.3 2.4 -.4 1.5 1.5 1.2 1.3 1.3 2.5 2.6 1.8 1.5 .9 .6 7.0 3.8 4.0 2.0 3.5 3.3 3.0 4.7 3.0 4.0 2.7 2.6 2.2 4.9
1.3 1.3 1.1 .9 -1.0 -.2 -.3 2.4 .7 -.9 3.2 1.0 1.0 .7 1.0 .6 .6 .8 .4 .1 .1 3.6 3.4 2.6 3.9 7.5 3.7 5.6 3.2 3.0 3.9 7.1 7.9 5.2 2.1
2.5 .4 .0 -2.1 -2.0 -1.1 -.7 .1 -.7 -1.0 -1.6 -.8 -.8 -.3 -1.3 -1.1 -.1 .6 -.9 -2.5 -2.7 .9 -.8 1.8 1.6 1.4 3.3 2.2 .3 2.5 3.2 4.6 4.8 5.7 4.9 1.2
1.5 .8 -.5 -1.8 .3 -1.5 -.7 -.7 .1 -.1 -.4 -1.7 -.8 -.7 -.9 -1.7 -.7 -1.4 -1.3 -1.2 -1.2 -1.1 .9 .2 .4 .8 .3 -1.0 -.4 2.1 -.3 1.2 1.1 3.4 3.5 1.0
-1.6 -1.0 -.5 -1.5 -1.2 -.4 -.9 -.6 -.7 -1.3 -1.1 -.6 -1.4

SATOBS : RMS O–B VECTOR DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 19
MARCH 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT



			4	4	4																														
4	5	4	4	3	4	4	4	4	4	4	5	5	5	5	8	6		5	4	4	4	4	4	4	5	4					8		10		
5	5	5	5	4	4	4	5	4		5		5	4	5	5	5	5	6	4	5	4	4	4	5	8	6	8	11	9	10	11	11	10	10	7
5	4	5	6	7	6	6	5	5	5	6	5	4	4	4	4	4	6	5	6	8	5	6	5	9	11	11	13	12	12	12	[illegible]	14	13	8	6
5	4	5	5	7	6	7	6	5	5	6	6	5	4	7	5	5	7	10	8	7		9	13	19	22	28	15	11	9	9	10	12	8	8	6
9	4	5	6	6	7	6	5	5	5	5	5	6	5	5	6	6	6	7				10	17	13	16	11	12	9	8	6	5	6	7	9	8
10	9	5	5	5	6	5	4	4	4	5	4	4	4	4	4	6	4	3	4	6	4	8	10	7	11	10	15	9	7	7	4	4	6	9	11
5	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	5	5	6	4	3	4	12	11	10	11	14	14	13	11	13			6	9	10
7	4	4	4	5	5	6	5	5	5	8	7	5	4	5	3	5	5	5	5	4	4	12	9	11	7	9	9	9	8	7	8	9	11	8	7
6	5	5	5	5	4	6	6	5	6	7	6	4	4	4	4	4	4		5	4	3	10	10	10	10	12	8	10	9	8	9	10	11	9	6
6	5	6	8	7	6	4	4	4	5	5	6	6	7	6	5	5	6	6	10	7	5	4	6	8	7	8	9	6	7	10	9	9	10	10	5
4	4	5	7	6	7	5	4	5	6	6	5	5	5	6	7	7	7	6	6	7	7	7	6	6	6	7	6	8	9	11	9	8	9	8	4
															7	7	6	6	5	5	6	6	6	7	6	7	5								

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 101 AND 400 HPA FIGURE 20
MARCH 1999



			0	0	0	0		0				0																							
1	7	7	6	6	4	9	16	7	4	6	7	11	14	8	8	9	5	9	8	6	5	5	3	2	1	1	0			0	0	1	1	0	0
36	38	28	14	10	14	31	40	32	14	9	26	51	57	67	36	14	15	15	11	20	26	17	7	11	15	15	11	12	12	11	9	8	15	25	23
90	63	39	38	28	28	51	83	97	58	39	55	118	122	101	66	16	15	17	29	29	28	31	26	35	28	30	36	45	46	32	25	28	36	50	108
125	90	51	43	49	46	115	152	129	88	58	51	90	83	86	30	9	11	20	13	11	7	14	22	16	7	1	4	11	14	15	21	24	28	41	89
144	118	119	105	105	131	153	208	61	94	150	166	109	87	63	29	20	25	48	35	17	5	7	6	2	7	13	48	48	42	35	19	8	9	14	38
78	46	27	38	60	75	62	69	97	175	286	225	247	210	171	48	52	50	98	94	98	52	35	41	32	70	104	188	147	132	85	69	51	39	42	38
118	102	100	105	126	123	46	179	167	151	273	320	353	314	242	43	29	33	93	106	119	90	72	62	37	53	70	147	129	116	79	67	54	52	45	40
179	168	186	152	99	90	55	69	51	40	146	182	209	161	92	13	1	5	24	67	63	54	61	50	30	27	48	97	77	69	46	35	46	43	50	68
130	120	146	131	115	122	80	37	11	3	12	71	110	111	145	103	29	6	2	18	36	26	23	29	25	23	14	16	17	27	32	29	31	46	59	128
61	72	82	76	52	105	160	70	38	28	15	27	61	77	101	93	43	40	31	20	27	34	30	19	29	33	24	22	33	26	31	27	29	29	34	84
10	12	12	6	5	13	30	29	26	20	13	17	29	32	39	37	25	21	26	31	42	44	38	28	27	29	32	22	14	17	23	23	23	24	19	9
														2	3	6	7	6	4	5	6	7	9	8	8	6	4		0	0	0	0	0	0	0

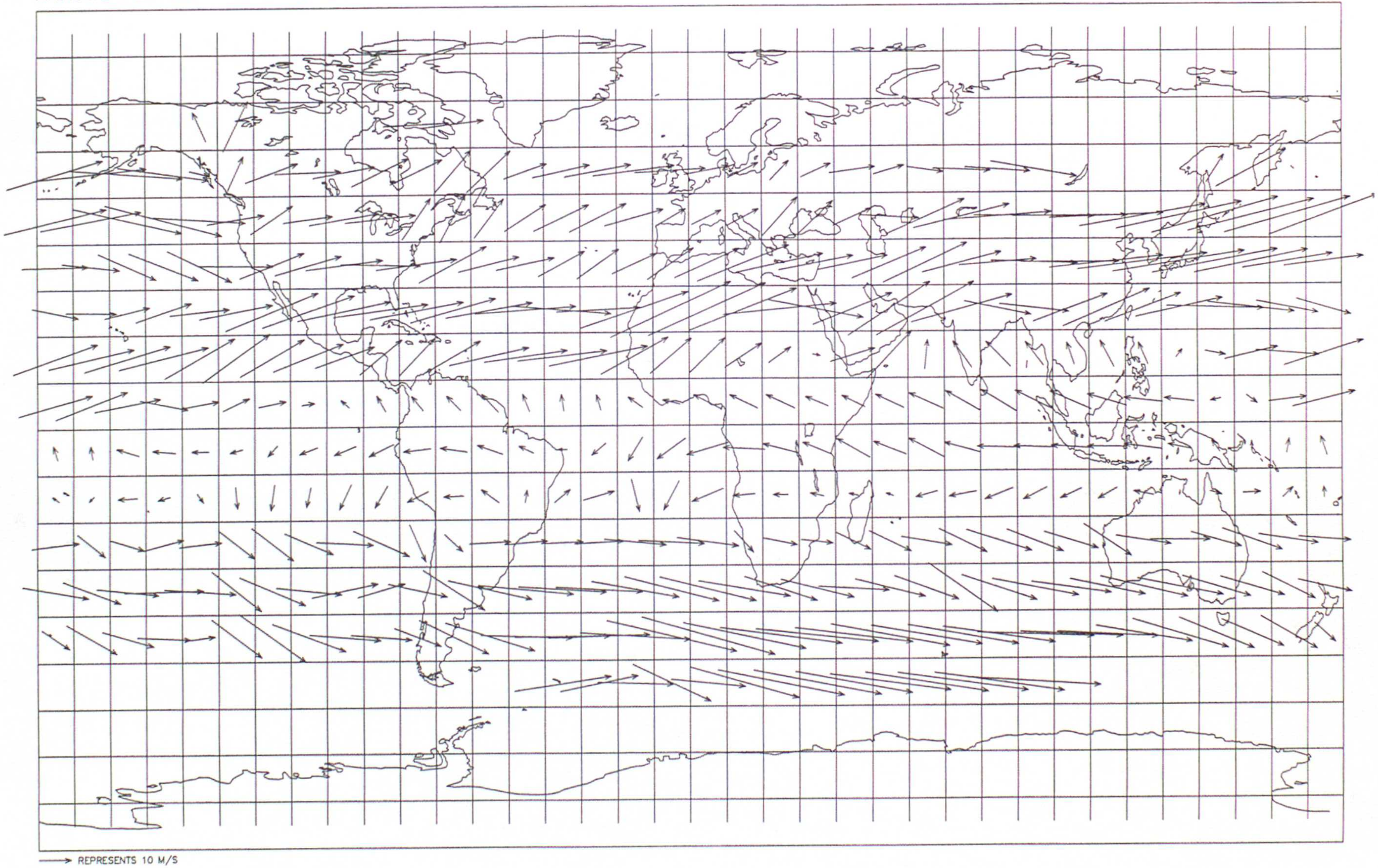
SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 101–400 HPA

FIGURE 21

MARCH 1999

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


→ REPRESENTS 10 M/S

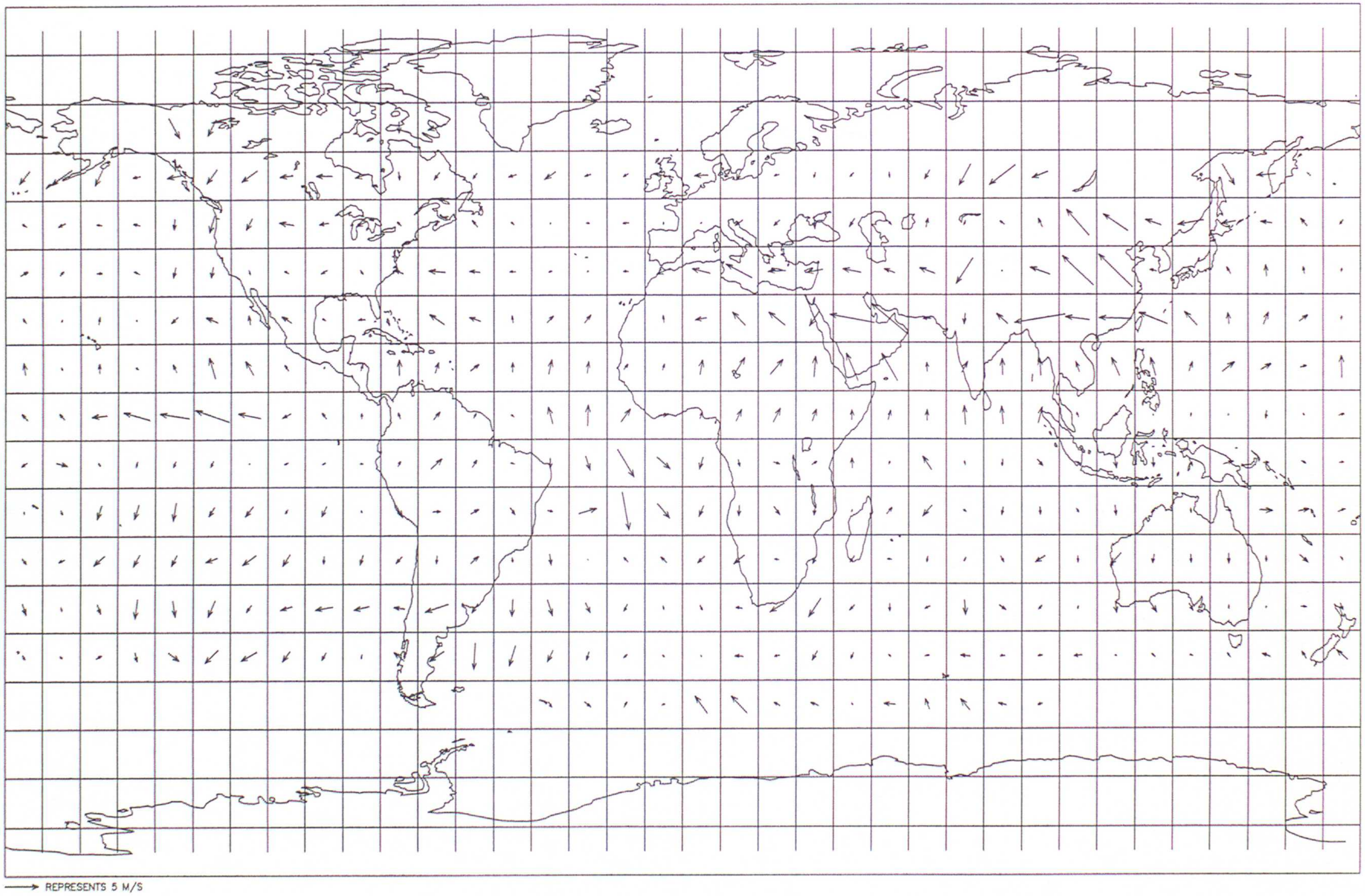
SATOB O–B VECTOR WIND DIFFERENCES BETWEEN 101–400 HPA

FIGURE 22

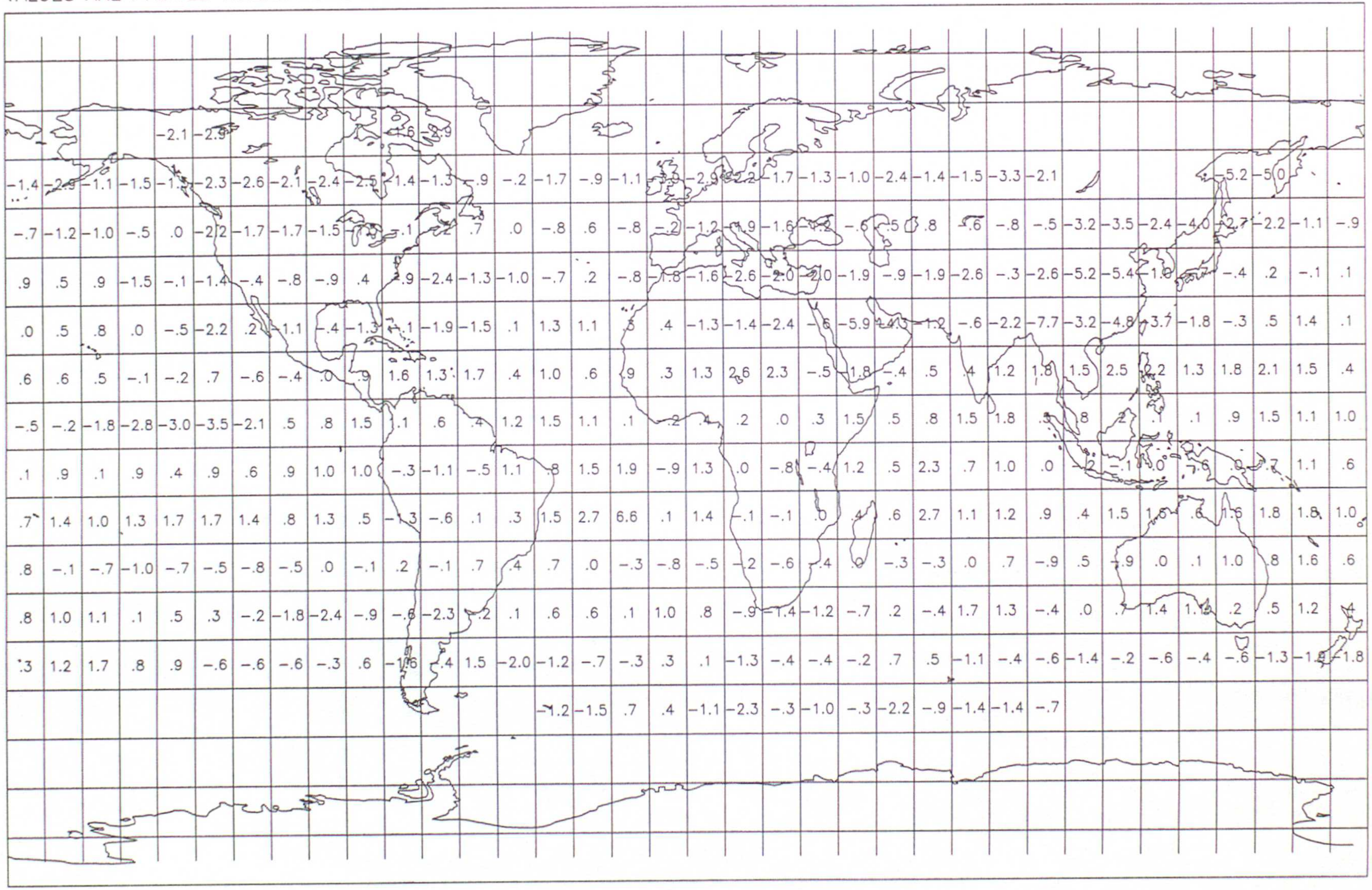
MARCH 1999

ALL OBSERVATIONS

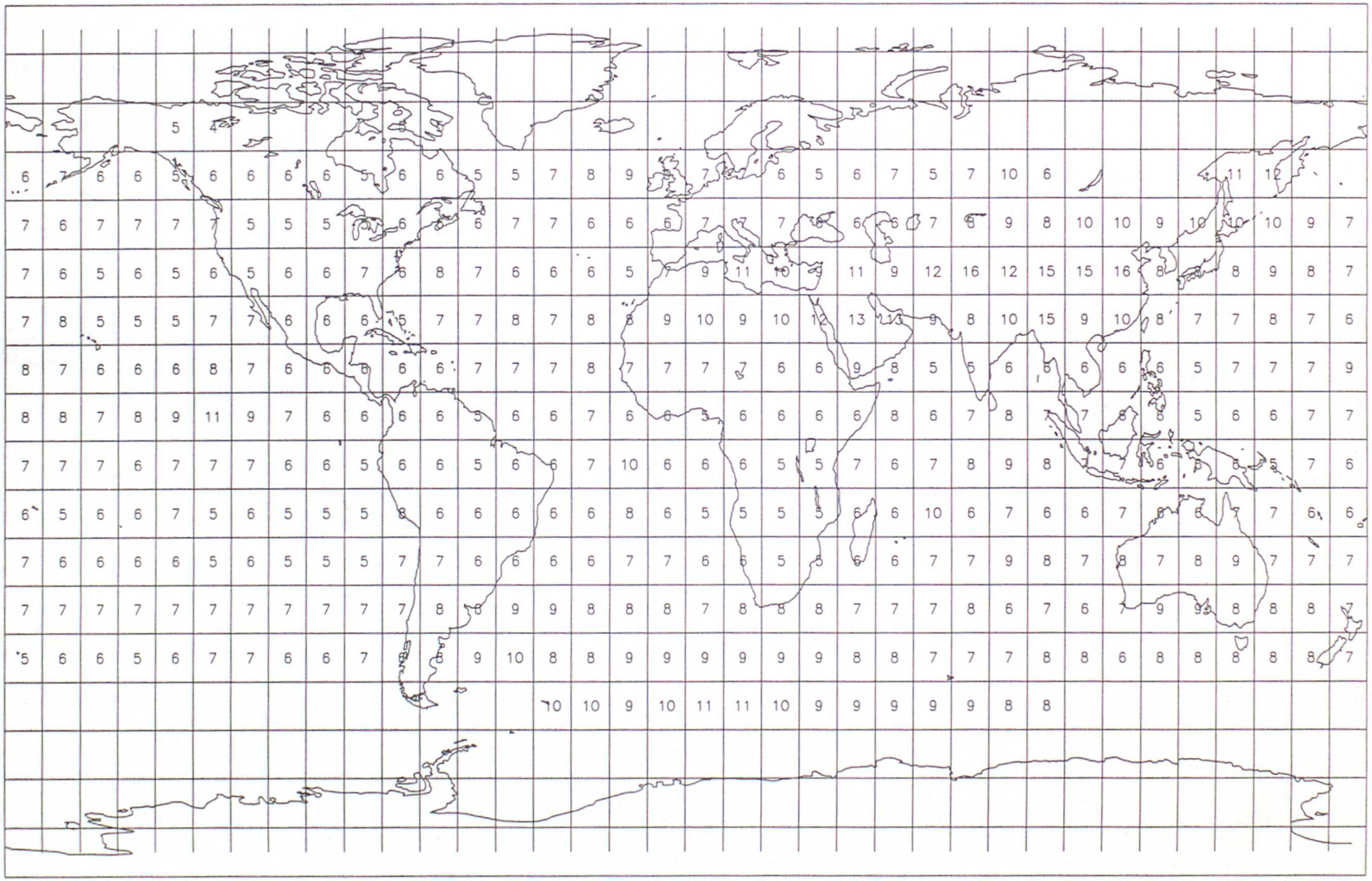
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 5 M/S

SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 23
MARCH 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


-2.1 -2.9 -1.6 -2.9
-1.4 -2.9 -1.1 -1.5 -1.5 -2.3 -2.6 -2.1 -2.4 -2.5 -1.4 -1.3 .9 -.2 -1.7 -.9 -1.1 -3.0 -2.9 -2.2 -1.7 -1.3 -1.0 -2.4 -1.4 -1.5 -3.3 -2.1 -5.2 -5.0
-.7 -1.2 -1.0 -.5 .0 -2.2 -1.7 -1.7 -1.5 -.1 -.2 .7 .0 -.8 .6 -.8 -.2 -1.2 -1.9 -1.6 -1.2 -.6 -.5 .8 -.6 -.8 -.5 -3.2 -3.5 -2.4 -4.0 -2.7 -2.2 -1.1 -.9
.9 .5 .9 -1.5 -.1 -1.4 -.4 -.8 -.9 .4 .9 -2.4 -1.3 -1.0 -.7 .2 -.8 -1.8 -1.6 -2.6 -2.0 -2.0 -1.9 -.9 -1.9 -2.6 -.3 -2.6 -5.2 -5.4 -1.0 -.7 -.4 .2 -.1 .1
.0 .5 .8 .0 -.5 -2.2 .2 -1.1 -.4 -1.3 -1.1 -1.9 -1.5 .1 1.3 1.1 .3 .4 -1.3 -1.4 -2.4 -.6 -5.9 -4.3 -1.2 -.6 -2.2 -7.7 -3.2 -4.8 -3.7 -1.8 -.3 .5 1.4 .1
.6 .6 .5 -.1 -.2 .7 -.6 -.4 .0 .9 1.6 1.3 1.7 .4 1.0 .6 .9 .3 1.3 2.6 2.3 -.5 -1.8 -.4 .5 .4 1.2 1.8 1.5 2.5 2.2 1.3 1.8 2.1 1.5 .4
-.5 -.2 -1.8 -2.8 -3.0 -3.5 -2.1 .5 .8 1.5 1.1 .6 .4 1.2 1.5 1.1 .1 .2 .4 .2 .0 .3 1.5 .5 .8 1.5 1.8 .3 .8 .2 .1 .1 .9 1.5 1.1 1.0
.1 .9 .1 .9 .4 .9 .6 .9 1.0 1.0 -.3 -1.1 -.5 1.1 .8 1.5 1.9 -.9 1.3 .0 -.8 -.4 1.2 .5 2.3 .7 1.0 .0 -.2 -.1 .0 .6 .0 .7 1.1 .6
.7 1.4 1.0 1.3 1.7 1.7 1.4 .8 1.3 .5 -1.3 -.6 .1 .3 1.5 2.7 6.6 .1 1.4 -.1 -.1 .0 .4 .6 2.7 1.1 1.2 .9 .4 1.5 1.5 .6 1.6 1.8 1.8 1.0
.8 -.1 -.7 -1.0 -.7 -.5 -.8 -.5 .0 -.1 .2 -.1 .7 .4 .7 .0 -.3 -.8 -.5 .2 -.6 .4 .0 -.3 -.3 .0 .7 -.9 .5 .9 .0 .1 1.0 .8 1.6 .6
.8 1.0 1.1 .1 .5 .3 -.2 -1.8 -2.4 -.9 -.6 -2.3 .2 .1 .6 .6 .1 1.0 .8 -.9 -1.4 -1.2 -.7 .2 -.4 1.7 1.3 -.4 .0 .7 1.4 1.1 .2 .5 1.2 .4
.3 1.2 1.7 .8 .9 -.6 -.6 -.6 -.3 .6 -1.6 -.4 1.5 -2.0 -1.2 -.7 -.3 .3 .1 -1.3 -.4 -.4 -.2 .7 .5 -1.1 -.4 -.6 -1.4 -.2 -.6 -.4 -.6 -1.3 -1.9 -1.8
-1.2 -1.5 .7 .4 -1.1 -2.3 -.3 -1.0 -.3 -2.2 -.9 -1.4 -1.4 -.7

SATOBS : RMS O–B VECTOR DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 24
MARCH 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT



MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: March 1999

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from NOAA-11, NOAA-14 500 km.
Standard of comparison	:Background field from Bracknell global model.
Selection Criteria	:All SATEM soundings where number of observations > 30.
Data Extracted	:Layer: 850 - 1000 hPa 100 - 300 hPa 30 - 50 hPa
	:Mean observation minus background temperature differences

NO DATA AVAILABLE

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoy.

Area monitored :10°N - 80°N, 85°W - 0°W

Standard of comparison :Background field from Bracknell global model.

Position :Average latitude and longitude for period.

Observation times :All hours combined.

Elements monitored :Mean sea-level pressure (hPa)
:Wind speed (m s^{-1})
:Wind direction (degrees)

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. A positive bias indicates the observation is veered to the background

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors

GROSS ERROR LIMITS :15 hPa (pressure)
:25 m s^{-1} (Vector Wind)

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
13505	15.4	-31.1	ALL	P	SUR	411	0	0	0.6	0.3	0.7
13507	24.6	-20.1	ALL	P	SUR	367	1	0	0.7	-0.4	0.8
13508	19.3	-21.0	ALL	P	SUR	480	2	0	0.8	0.2	0.9
13509	12.5	-21.1	ALL	P	SUR	416	0	0	1.0	0.0	1.0
13510	24.6	-26.5	ALL	P	SUR	496	7	1	0.7	0.1	0.7
13511	19.7	-25.5	ALL	P	SUR	481	1	0	0.8	-0.7	1.1
13512	14.1	-27.2	ALL	P	SUR	441	0	0	1.1	0.5	1.2
41501	14.0	-33.9	ALL	P	SUR	362	1	0	0.8	0.4	0.9
41502	20.7	-46.7	ALL	P	SUR	206	0	0	0.8	0.4	0.9
41503	25.1	-64.2	ALL	P	SUR	264	0	0	1.0	0.0	1.0
41504	25.7	-71.7	ALL	P	SUR	273	0	0	1.0	0.1	1.0
41505	31.5	-61.9	ALL	P	SUR	291	0	0	1.0	0.2	1.0
41521	25.8	-56.4	ALL	P	SUR	276	0	0	0.8	0.2	0.8
41522	23.0	-31.6	ALL	P	SUR	410	2	0	0.8	0.0	0.8
41523	16.0	-38.3	ALL	P	SUR	429	0	0	0.8	0.3	0.9
41524	10.5	-36.1	ALL	P	SUR	381	0	0	0.9	-0.1	0.9
41528	29.0	-67.5	ALL	P	SUR	276	0	0	1.1	0.3	1.1
41598	27.0	-45.7	ALL	P	SUR	364	5	1	1.3	0.5	1.4
41599	28.4	-37.0	ALL	P	SUR	618	7	1	0.8	0.0	0.8
41625	24.1	-74.0	ALL	P	SUR	249	0	0	1.0	0.0	1.0
41629	24.4	-70.2	ALL	P	SUR	260	0	0	1.0	0.1	1.0
41636	21.7	-60.7	ALL	P	SUR	495	21	4	1.2	0.6	1.3
41637	25.1	-49.3	ALL	P	SUR	312	6	2	1.0	0.8	1.2
41638	22.9	-60.6	ALL	P	SUR	619	0	0	1.2	0.4	1.2
44513	38.9	-43.8	ALL	P	SUR	213	0	0	0.9	-0.7	1.1
44514	44.4	-43.9	ALL	P	SUR	223	0	0	1.1	-0.6	1.2
44515	40.4	-45.1	ALL	P	SUR	211	0	0	0.9	-0.1	0.9
44516	41.8	-48.1	ALL	P	SUR	213	0	0	1.0	-0.8	1.3
44517	41.0	-47.5	ALL	P	SUR	214	0	0	1.0	-0.6	1.1
44546	43.8	-43.6	ALL	P	SUR	336	0	0	1.4	0.3	1.4
44607	52.0	-47.5	ALL	P	SUR	440	0	0	1.5	-0.5	1.6
44608	48.1	-44.1	ALL	P	SUR	603	0	0	1.3	-0.3	1.3
44610	54.0	-41.9	ALL	P	SUR	544	1	0	1.5	-0.1	1.5
44613	42.5	-20.9	ALL	P	SUR	1278	15	1	1.2	-0.2	1.2
44616	56.8	-27.5	ALL	P	SUR	997	0	0	1.6	0.1	1.6
44621	47.5	-45.5	ALL	P	SUR	234	0	0	1.3	-0.7	1.5
44624	55.0	-32.0	ALL	P	SUR	995	3	0	1.5	-0.2	1.5
44726	60.7	-1.4	ALL	P	SUR	19	0	0	2.1	0.7	2.2
44728	52.5	-37.2	ALL	P	SUR	203	0	0	1.8	-0.3	1.8
44742	45.0	-4.6	ALL	P	SUR	1290	11	1	1.2	-0.2	1.2
44760	53.6	-9.9	ALL	P	SUR	767	11	1	1.5	0.4	1.5
44762	39.9	-45.1	ALL	P	SUR	425	1	0	1.0	0.4	1.1
44764	49.6	-15.8	ALL	P	SUR	1136	9	1	1.1	0.0	1.1
44765	39.4	-54.3	ALL	P	SUR	166	0	0	1.2	0.0	1.2
44766	56.7	-48.1	ALL	P	SUR	262	1	0	1.4	-0.3	1.4
44778	50.1	-18.9	ALL	P	SUR	1584	13	1	1.2	-0.1	1.2
44837	41.8	-60.9	ALL	P	SUR	1	0	0	0.0	0.8	0.8
44901	53.2	-9.0	ALL	P	SUR	173	0	0	2.0	1.3	2.4
46641	44.7	-63.6	ALL	P	SUR	6	6	100			
46660	44.7	-63.6	ALL	P	SUR	45	0	0	1.8	-5.5	5.7
62511	45.3	-17.5	ALL	P	SUR	57	1	2	0.9	0.7	1.1
62512	46.0	-18.5	ALL	P	SUR	305	0	0	1.0	0.2	1.0
62513	46.6	-8.6	ALL	P	SUR	6	0	0	0.9	1.0	1.4
62515	60.9	-7.8	ALL	P	SUR	2059	13	1	1.5	0.5	1.6
62518	39.9	-13.1	ALL	P	SUR	1	1	100			
62519	36.1	-20.8	ALL	P	SUR	1005	7	1	0.8	-0.1	0.9
62520	43.0	-21.4	ALL	P	SUR	1006	2	0	1.0	-0.5	1.1
62554	44.1	-14.4	ALL	P	SUR	967	2	0	1.0	0.2	1.0
62674	63.8	-21.1	ALL	P	SUR	276	0	0	1.4	-0.5	1.5
62675	40.4	-38.8	ALL	P	SUR	213	0	0	0.8	-0.2	0.9

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
62887	51.0	-3.3	ALL	P	SUR	1	0	0	0.0	-7.9	7.9
64516	62.5	-30.5	ALL	P	SUR	389	0	0	1.8	0.0	1.8
64517	64.2	-30.5	ALL	P	SUR	475	3	1	1.5	0.2	1.5
64518	64.8	-30.2	ALL	P	SUR	879	1	0	1.6	-0.5	1.6
64519	60.7	-32.1	ALL	P	SUR	240	0	0	2.3	0.2	2.3
64520	64.8	-31.3	ALL	P	SUR	840	4	0	1.5	-0.3	1.5
64529	60.4	-12.0	ALL	P	SUR	1310	15	1	2.1	-0.9	2.3
65581	58.7	-79.0	ALL	P	SUR	437	0	0	1.2	-0.1	1.2
65591	55.7	-10.7	ALL	P	SUR	1419	6	0	1.3	0.1	1.3
65592	61.7	-22.0	ALL	P	SUR	1143	11	1	1.9	-0.5	1.9
65593	61.1	-26.3	ALL	P	SUR	601	5	1	1.7	-0.3	1.7
65594	61.3	-35.8	ALL	P	SUR	116	0	0	1.2	-0.4	1.2
65595	58.4	-40.3	ALL	P	SUR	48	1	2	0.8	-0.2	0.9
65599	64.2	-31.3	ALL	P	SUR	2270	10	0	1.3	-0.1	1.3
99903	41.2	-40.4	ALL	P	SUR	1	0	0	0.0	-4.5	4.5

WIND SPEED

41504	25.7	-71.7	ALL	SPEED	SUR	407	0	0	1.4	-2.3	2.7
41521	25.8	-56.4	ALL	SPEED	SUR	392	0	0	1.6	-0.3	1.6
41625	24.1	-74.0	ALL	SPEED	SUR	317	0	0	1.4	-0.2	1.4
41629	24.4	-70.2	ALL	SPEED	SUR	374	0	0	1.4	-1.0	1.7
41636	21.7	-60.7	ALL	SPEED	SUR	544	0	0	1.7	-1.0	2.0
41637	25.1	-49.3	ALL	SPEED	SUR	294	0	0	1.4	-0.4	1.5
41638	22.9	-60.6	ALL	SPEED	SUR	632	0	0	1.6	-0.6	1.7
44607	52.0	-47.5	ALL	SPEED	SUR	471	0	0	2.5	1.9	3.2
44762	39.9	-45.1	ALL	SPEED	SUR	515	0	0	2.0	0.1	2.0
44837	41.8	-60.9	ALL	SPEED	SUR	1	0	0	0.0	-2.9	2.9
62515	60.9	-7.8	ALL	SPEED	SUR	2	0	0	0.0	0.0	0.0
62517	44.6	-6.1	ALL	SPEED	SUR	799	0	0	1.9	0.5	1.9
62518	39.9	-13.1	ALL	SPEED	SUR	3	0	0	4.2	-3.0	5.2
64529	60.4	-12.0	ALL	SPEED	SUR	1	1	100			
65599	64.2	-31.3	ALL	SPEED	SUR	1972	5	0	3.0	-1.1	3.2
99903	41.2	-40.4	ALL	SPEED	SUR	2	0	0	0.0	6.7	6.7

WIND DIRECTION

41502	20.7	-46.7	ALL	DIRN.	SUR	202	0	0	33.2	7.0	33.9
41503	25.1	-64.2	ALL	DIRN.	SUR	259	0	0	52.8	19.4	56.3
41504	25.7	-71.7	ALL	DIRN.	SUR	102	0	0	27.2	9.1	28.6
41521	25.8	-56.4	ALL	DIRN.	SUR	154	0	0	13.2	-13.8	19.1
41625	24.1	-74.0	ALL	DIRN.	SUR	161	0	0	21.3	7.2	22.5
41629	24.4	-70.2	ALL	DIRN.	SUR	140	0	0	18.6	13.0	22.7
41636	21.7	-60.7	ALL	DIRN.	SUR	122	0	0	23.5	5.4	24.1
41637	25.1	-49.3	ALL	DIRN.	SUR	130	0	0	17.8	-2.1	17.9
41638	22.9	-60.6	ALL	DIRN.	SUR	154	0	0	23.4	16.8	28.8
44607	52.0	-47.5	ALL	DIRN.	SUR	356	0	0	18.4	1.2	18.5
44613	42.5	-20.9	ALL	DIRN.	SUR	1	0	0	0.0	-77.8	77.8
44762	39.9	-45.1	ALL	DIRN.	SUR	324	0	0	22.0	-11.3	24.7
44837	41.8	-60.9	ALL	DIRN.	SUR	1	0	0	0.0	-3.1	3.1
62517	44.6	-6.1	ALL	DIRN.	SUR	408	0	0	19.8	-4.4	20.3
64529	60.4	-12.0	ALL	DIRN.	SUR	1	1	100			
65599	64.2	-31.3	ALL	DIRN.	SUR	1092	5	0	34.1	-0.1	34.1

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures:

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :40°N - 70°N, 60°W - 0°W.

Standard of comparison :Background field from Bracknell global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

Parameters monitored	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB: US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

	TEMPERATURE					WIND				
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	3211	2	32	2.1	-0.1	2400	0	16	0	8.1	0.8
ACA	1257	1	20	2.0	-0.3	1084	0	10	0	6.9	0.7
AEA	166	1	32	2.3	0.0	137	0	23	0	8.3	1.2
AEL	547	0	18	1.9	-0.4	551	1	17	0	8.5	1.3
AEY	30	0	3	2.3	1.3	30	0	0	0	9.1	-0.9
AFL	338	0	15	1.9	0.4	308	0	10	0	8.6	0.7
AFR	1335	1	14	1.8	0.2	1326	0	15	0	9.5	1.2
AIH	147	1	11	2.0	-0.1	141	1	6	0	6.8	1.1
AJM	77	0	3	1.7	-0.9	77	0	6	0	8.8	1.6
AMM	48	0	2	1.4	-0.1	48	0	0	0	6.3	0.7
AMX	216	4	10	2.4	0.0	213	0	4	0	9.2	1.7
ANZ	224	1	5	2.4	-0.5	220	1	5	0	7.4	0.5
AOM	399	1	4	1.4	0.4	400	0	4	0	8.7	1.0
AVA	146	0	2	1.7	-0.1	144	1	8	0	9.8	0.9
AZA	426	2	32	2.5	0.8	351	1	23	0	8.7	0.7
BAF	21	5	19	1.8	-0.5	21	5	24	0	8.7	1.5
BAL	305	1	23	1.4	-0.1	305	0	23	0	8.9	1.5
BAW	1490	2	23	2.2	-0.2	1371	0	17	0	7.4	1.0
BLX	29	0	0	1.5	-0.2	29	0	0	0	6.3	1.4
BWA	107	1	19	2.0	1.4	99	0	14	0	10.8	1.7
CDN	667	0	17	2.1	0.5	583	0	8	0	7.8	0.9
CFG	629	1	8	1.9	-0.7	613	0	5	0	8.9	1.4
CKS	33	0	9	1.2	0.1	33	0	3	0	6.9	-1.1
CKT	69	1	16	2.2	1.4	65	0	11	0	10.5	1.6
CLX	346	1	7	1.8	-0.2	335	0	4	0	7.0	0.5
CMM	66	2	12	1.4	0.4	57	2	7	0	5.4	0.9
COA	827	1	29	2.0	-0.2	664	0	19	0	12.6	2.5
CRL	323	2	6	1.7	0.3	324	0	4	0	8.4	1.3
CTB	232	1	3	1.9	-0.7	236	0	4	0	9.6	1.4
CUB	295	2	14	1.7	0.7	288	0	11	0	9.2	0.9
DAF	32	0	0	2.0	-1.1	32	0	0	0	7.5	2.6
DAL	1727	0	39	1.8	-0.6	1228	0	27	0	9.5	0.8
DBY	321	1	3	1.8	-0.7	335	0	5	0	9.9	0.7
DLH	2269	1	22	1.9	-0.1	1990	0	16	0	7.7	0.7
EEZ	52	2	31	1.6	-0.4	49	0	33	0	11.9	-1.2
EIA	21	0	19	2.4	0.1	22	0	23	0	17.7	-2.7
ELY	146	1	10	1.9	-0.1	146	0	5	0	6.5	1.0
EWW	101	0	27	1.6	0.3	87	0	17	0	9.8	2.3
FDX	487	2	38	2.1	0.5	350	0	21	0	7.9	0.7
FIN	513	1	23	2.0	0.3	410	0	11	0	7.1	0.8
GAF	42	0	52	2.5	-1.6	26	0	23	0	7.4	-0.3
GTI	46	2	46	2.2	0.3	37	0	35	0	7.3	2.4
HLF	47	0	13	1.9	-0.6	47	0	11	0	8.2	0.2
IBE	1459	1	29	2.0	0.4	1380	0	26	0	9.1	1.5
ICE	998	1	28	2.0	0.0	783	0	17	0	7.2	0.9
JKK	145	0	34	1.8	-0.1	115	1	19	0	8.8	1.8
KLM	2149	0	16	1.8	0.2	1993	0	11	0	7.7	0.8
LDA	89	2	26	1.9	0.5	76	0	21	0	6.7	1.1
LDI	509	0	38	2.1	-0.9	416	0	29	0	8.6	1.2
LIB	168	2	5	1.5	0.7	170	1	9	0	11.3	0.8
LOT	180	1	32	2.0	-0.9	139	1	19	0	7.3	-0.1
LTU	485	1	35	1.9	-0.4	370	0	18	0	7.5	1.1
MAS	68	0	24	1.9	0.7	62	0	19	0	9.3	0.8
MON	23	0	13	1.6	0.3	22	0	14	0	5.9	0.2
MPD	58	3	31	2.0	0.8	45	0	18	0	9.2	2.1
MPH	448	0	15	1.7	-0.3	412	1	8	0	7.5	1.1
NCA	36	0	0	1.2	0.0	35	0	0	0	5.5	0.7
NWA	3018	0	13	1.9	0.6	2739	0	7	0	8.1	0.5
PAC	104	1	29	1.9	0.4	87	0	20	0	9.4	0.8

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
RAM	36	0	3	2.5	0.0	36	0	3	0	8.3	2.1
RCH	114	4	25	2.2	0.7	100	0	100	0	12.1	2.6
RRR	83	0	30	1.8	-0.3	77	0	53	0	7.6	1.6
SAB	116	3	11	1.8	-0.1	115	0	6	0	7.6	0.1
SAS	1481	0	2	1.6	-0.4	1462	0	3	0	8.0	0.5
SED	24	0	13	2.4	-1.3	22	0	9	0	7.9	0.6
SEU	49	0	14	1.9	1.3	45	0	13	0	8.8	2.2
SIA	150	1	8	2.1	-0.8	153	0	8	0	9.4	0.4
SLR	107	3	21	1.6	-0.2	110	0	20	0	9.6	1.4
SVA	116	3	12	2.0	-0.5	116	0	8	0	9.2	-0.1
SWR	103	0	25	1.9	0.3	87	0	10	0	7.9	1.6
TAP	275	0	8	1.7	0.1	270	0	10	0	9.8	1.9
TOW	144	0	36	2.2	0.3	107	0	21	0	11.0	1.6
TWA	1213	1	38	2.2	0.4	844	0	22	0	8.7	1.7
UAL	2011	1	18	2.1	-0.1	1769	0	10	0	6.7	0.7
UPS	639	1	44	1.9	0.3	517	0	36	0	7.7	0.8
USA	289	1	31	2.0	-0.4	218	0	18	0	8.8	2.0
VIR	288	1	18	2.2	-0.3	250	0	12	0	8.4	1.1
VKG	58	3	28	1.5	0.2	53	0	21	0	10.9	0.4
WOA	58	0	21	1.4	0.6	52	0	35	0	9.8	1.9
BA	9467	0	1	1.3	0.1	9462	0	1	0	5.8	0.6
KL	4033	0	1	1.7	1.1	4025	0	1	0	6.2	0.7
LH	34	3	3	1.4	0.4	34	0	3	0	7.5	0.0
N	260	0	5	2.3	0.8	273	0	4	0	8.1	0.7
ADS	980	0	16	1.3	-0.4	980	0	16	0	6.1	0.6
US ACARS	11184	0	3	1.5	0.3	11174	0	2	0	6.6	0.7

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from Bracknell global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

```
 WMO   OBS                    NUM    NUM
IDENT  TIME  ELM   LEV        OBS   GROSS       SD       RMS      BIAS

DBBH    00    Z    100         1      0        0.0       3.0       3.0
DBBH    12    Z    100         6      1       13.6      17.3     -10.7
DBLK    00    Z    100         1      0        0.0      10.0      10.0
ELML7   00    Z    100        16      0       11.2      11.6       3.1
ELML7   12    Z    100        20      0       14.4      24.5      19.8

FNOR    00    Z    100        13      0       13.7      32.6      29.5
FNOR    12    Z    100        15      0       15.6      23.8      18.0
FNOU    00    Z    100        14      0       22.8      29.8      19.2
FNOU    12    Z    100        12      0       13.8      28.6      25.1
FNPH    00    Z    100        10      0       16.2      18.5       8.9

FNPH    12    Z    100        13      0       17.4      18.0       4.6
FNRS    00    Z    100        10      0       11.9      19.5      15.4
FNRS    12    Z    100        11      0       15.5      17.7       8.5
FNXH    00    Z    100         1      0        0.0       8.0      -8.0
LDWR    00    Z    100        28      0       17.6      17.6       0.6

LDWR    12    Z    100        26      0       10.7      10.8      -1.2
OVYA2   00    Z    100        12      0       19.6      22.6     -11.3
OVYA2   12    Z    100        11      0       11.5      11.6       1.6
OXTS2   00    Z    100        15      0       19.2      22.9     -12.5
OXTS2   12    Z    100        13      0       23.2      28.1      15.8

SHIPBR  00    Z    100         1      0        0.0      12.0     -12.0
UCKZ    00    Z    100         1      0        0.0      30.0      30.0
V2XM    00    Z    100         3      0        5.7      13.3      12.0
V2XM    12    Z    100         4      0       25.5      27.8     -11.0
WTEC    00    Z    100         1      0        0.0       6.0      -6.0

XXBA    00    Z    100         1      0        0.0      54.0      54.0
XXBA    12    Z    100         2      0       14.5      41.1      38.5
03953   00    Z    100        29      0       14.0      14.4       3.1
03953   12    Z    100        29      0       14.3      15.8       6.8
04018   00    Z    100        29      0       16.3      16.3      -1.2

04018   12    Z    100        28      0       19.5      19.7       2.3
04220   00    Z    100        12      0       14.7      19.2      12.3
04220   12    Z    100         4      0        9.0      16.9      14.3
04270   00    Z    100        25      2       15.4      15.4       1.0
04270   12    Z    100        26      0       13.3      13.4       1.3

04339   00    Z    100        26      0       16.0      16.2       2.6
04339   12    Z    100        23      0       16.7      17.3       4.3
04360   00    Z    100        26      0       14.1      14.2       0.7
04360   12    Z    100        26      0       15.5      15.7       2.7
08001   00    Z    100        24      0       14.2      14.6      -3.2

08001   12    Z    100        27      0       12.0      13.6      -6.5
08508   12    Z    100        20      0       43.5      44.6      -9.4
08522   12    Z    100        28      0       26.8      27.0      -3.1
08594   12    Z    100        22      0       16.9      21.1      12.5
60020   00    Z    100         1      0        0.0       2.0       2.0

71600   00    Z    100        29      0       21.5      26.7      15.8
71600   12    Z    100        29      0       19.6      19.6       0.7
72201   00    Z    100        24      0       15.6      21.6      15.0
72201   12    Z    100        24      0       29.5      30.7       8.4
72402   00    Z    100        23      0       12.9      13.0       1.0

72402   12    Z    100        25      0       15.8      21.6      14.7
74494   00    Z    100        22      1       12.8      12.8       0.3
74494   12    Z    100        27      0       11.8      17.9     -13.4
78016   12    Z    100        28      0       21.2      34.5      27.3
```

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from Bracknell global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	00	Z	500	1	0	0.0	0.0	0.0
DBBH	12	Z	500	7	1	15.7	18.0	8.9
DBLK	00	Z	500	1	0	0.0	8.0	-8.0
ELML7	00	Z	500	20	0	10.0	12.8	7.9
ELML7	12	Z	500	21	0	13.4	15.7	8.2
FNOR	00	Z	500	14	0	11.2	25.3	22.6
FNOR	12	Z	500	15	0	13.4	23.1	18.8
FNOU	00	Z	500	14	0	14.5	21.6	16.1
FNOU	12	Z	500	12	0	11.8	22.1	18.7
FNPH	00	Z	500	11	0	5.4	13.1	11.9
FNPH	12	Z	500	13	0	8.8	17.0	14.5
FNRS	00	Z	500	11	0	10.5	15.3	11.1
FNRS	12	Z	500	11	0	9.1	15.1	12.1
FNXH	00	Z	500	1	0	0.0	3.0	3.0
JNSR	00	Z	500	1	0	0.0	22.0	22.0
LDWR	00	Z	500	29	0	10.0	10.1	-1.3
LDWR	12	Z	500	27	0	9.4	11.2	-6.0
OVYA2	00	Z	500	12	0	14.3	15.1	-4.9
OVYA2	12	Z	500	11	0	11.9	15.1	-9.2
OXTS2	00	Z	500	17	0	13.4	14.9	-6.5
OXTS2	12	Z	500	14	0	13.0	13.5	3.5
SHIPBR	00	Z	500	1	0	0.0	12.0	12.0
SHIPBX	00	Z	500	1	0	0.0	1.0	1.0
UCKZ	00	Z	500	1	0	0.0	8.0	8.0
V2XM	00	Z	500	4	0	6.3	10.6	-8.5
V2XM	12	Z	500	4	0	12.4	16.2	-10.5
WTEC	00	Z	500	1	0	0.0	11.0	-11.0
XXBA	00	Z	500	1	0	0.0	11.0	11.0
XXBA	12	Z	500	5	0	11.3	12.2	4.4
03953	00	Z	500	29	0	8.4	11.8	8.2
03953	12	Z	500	29	0	11.1	14.8	9.8
04018	00	Z	500	30	0	11.7	11.8	1.7
04018	12	Z	500	29	0	14.6	15.2	4.3
04220	00	Z	500	28	1	19.5	19.8	3.8
04220	12	Z	500	28	0	26.0	26.3	3.5
04270	00	Z	500	28	2	13.7	13.7	-0.5
04270	12	Z	500	28	0	11.6	11.8	-2.2
04339	00	Z	500	30	0	16.3	16.3	-0.2
04339	12	Z	500	26	0	13.3	13.4	1.7
04360	00	Z	500	29	0	12.1	12.3	-1.9
04360	12	Z	500	26	0	13.9	14.6	-4.4
08001	00	Z	500	27	0	11.5	12.2	4.2
08001	12	Z	500	29	0	11.6	11.8	2.1
08508	12	Z	500	28	0	28.5	28.7	3.8
08522	12	Z	500	28	0	14.9	18.8	11.5
08594	12	Z	500	23	0	8.6	9.5	4.2
60020	00	Z	500	27	0	12.7	17.5	12.0
60020	12	Z	500	29	0	11.3	17.2	12.9
71600	00	Z	500	29	0	12.0	12.1	1.6
71600	12	Z	500	29	0	10.7	10.7	0.9
72201	00	Z	500	26	0	9.6	15.0	11.5
72201	12	Z	500	25	0	12.7	12.9	2.3
72402	00	Z	500	25	0	13.0	13.1	-1.0
72402	12	Z	500	27	0	23.9	27.3	-13.1
74494	00	Z	500	26	1	12.5	12.7	1.8
74494	12	Z	500	29	0	10.2	11.5	-5.4
78016	12	Z	500	28	0	15.1	26.6	21.9

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from Bracknell global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	100	1	0	0	0.0	-1.7	-8.8
DBBH	12	V	100	8	0	0	0.0	-1.0	3.6
DBLK	00	V	100	1	0	0	0.0	3.9	-0.6
ELML7	00	V	100	10	0	0	0.0	1.3	0.9
ELML7	12	V	100	15	0	0	3.1	0.0	-0.4
FNOR	00	V	100	9	0	0	4.1	-0.4	-1.2
FNOR	12	V	100	14	0	0	4.1	-0.8	0.2
FNOU	00	V	100	11	0	0	3.3	-1.3	3.5
FNOU	12	V	100	11	0	9	3.9	-0.4	0.7
FNPH	00	V	100	10	0	0	2.6	-1.1	1.4
FNPH	12	V	100	11	0	0	2.7	1.0	-0.6
FNRS	00	V	100	8	0	0	4.4	-4.5	-0.8
FNRS	12	V	100	10	0	0	4.4	-1.3	1.9
LDWR	00	V	100	28	0	0	3.6	0.2	0.3
LDWR	12	V	100	27	0	0	2.7	-0.3	0.5
OVYA2	00	V	100	12	0	0	2.5	-1.3	0.1
OVYA2	12	V	100	11	0	0	2.4	-1.1	-0.1
OXTS2	00	V	100	12	0	0	2.7	-0.7	-0.8
OXTS2	12	V	100	10	0	0	2.2	-0.6	0.0
SHIPBR	00	V	100	1	0	0	3.2	-2.6	0.6
V2XM	00	V	100	3	0	0	3.2	3.3	-0.3
V2XM	12	V	100	1	0	0	3.2	3.4	-3.1
WTEC	00	V	100	1	0	0	3.2	0.8	1.2
03953	00	V	100	29	0	0	2.9	0.1	2.5
03953	12	V	100	29	0	0	2.6	-0.9	1.9
04018	00	V	100	29	0	0	2.5	0.1	0.1
04018	12	V	100	28	0	0	1.8	-0.5	0.0
04220	00	V	100	7	0	0	1.8	-0.5	-1.9
04220	12	V	100	1	0	0	1.8	2.6	-0.7
04270	00	V	100	24	0	0	1.8	-0.7	0.2
04270	12	V	100	24	0	0	2.2	0.5	0.1
04339	00	V	100	25	0	4	2.8	0.5	-1.4
04339	12	V	100	22	0	0	5.3	0.8	-1.1
04360	00	V	100	26	0	0	3.5	-0.7	-0.1
04360	12	V	100	25	0	0	3.3	-0.7	-0.5
08001	00	V	100	23	0	0	4.1	0.8	2.1
08001	12	V	100	25	0	0	2.8	-0.3	0.2
08508	12	V	100	17	0	0	2.5	1.0	0.3
08594	12	V	100	21	0	0	3.9	-5.1	3.7
71600	00	V	100	29	0	0	3.0	-0.3	-1.0
71600	12	V	100	29	0	0	2.3	-0.4	1.1
72201	00	V	100	24	0	0	3.5	-0.6	-0.3
72201	12	V	100	24	0	0	2.9	0.6	-0.8
72402	00	V	100	22	0	0	3.6	0.5	0.0
72402	12	V	100	25	0	0	2.9	0.1	0.6
74494	00	V	100	21	0	0	3.4	-0.3	-0.2
74494	12	V	100	27	0	0	2.2	-0.1	1.1
78016	12	V	100	28	0	0	4.9	1.7	0.3

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: March 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from Bracknell global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :500 hPa.

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:UBIAS,VBIAS: Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	500	1	0	0	0.0	-4.0	-1.3
DBBH	12	V	500	8	0	0	0.0	-0.3	-0.4
DBLK	00	V	500	1	0	0	0.0	-2.4	-0.2
ELML7	00	V	500	18	0	0	0.0	-0.1	-0.2
ELML7	12	V	500	18	0	0	3.3	0.9	0.1
FNOR	00	V	500	9	0	0	3.2	0.3	0.6
FNOR	12	V	500	14	0	7	3.2	-3.1	0.3
FNOU	00	V	500	11	0	0	3.3	0.3	-0.7
FNOU	12	V	500	11	0	9	3.6	-0.3	0.5
FNPH	00	V	500	11	0	0	2.4	-0.8	-2.4
FNPH	12	V	500	10	0	0	2.5	0.0	-0.5
FNRS	00	V	500	7	0	0	3.7	-4.8	-0.4
FNRS	12	V	500	8	0	0	3.7	1.3	-0.2
FNXH	00	V	500	1	0	0	3.7	0.3	-1.8
JNSR	00	V	500	1	0	0	3.7	-3.5	-2.6
LDWR	00	V	500	29	0	0	1.8	-0.4	0.5
LDWR	12	V	500	27	0	0	3.2	-0.4	-0.8
OVYA2	00	V	500	12	0	0	4.1	1.8	1.7
OVYA2	12	V	500	11	0	0	5.8	-1.7	-0.7
OXTS2	00	V	500	15	0	6	3.5	1.2	-1.7
OXTS2	12	V	500	12	0	0	6.1	-1.3	-1.3
SHIPBR	00	V	500	1	0	0	2.9	0.7	0.2
SHIPBX	00	V	500	1	0	0	2.9	0.2	-1.4
V2XM	00	V	500	4	0	0	2.9	2.1	0.0
V2XM	12	V	500	4	0	0	2.9	-1.4	-2.0
WTEC	00	V	500	1	0	0	2.9	0.1	0.8
03953	00	V	500	29	0	0	2.3	-0.3	0.2
03953	12	V	500	29	0	0	3.4	1.2	1.0
04018	00	V	500	30	0	0	2.9	0.8	-1.4
04018	12	V	500	29	0	0	4.0	1.4	-0.7
04220	00	V	500	23	0	0	4.2	0.9	-0.1
04220	12	V	500	23	0	0	5.3	-0.8	0.3
04270	00	V	500	29	0	0	4.6	-0.9	0.7
04270	12	V	500	28	0	0	2.7	-0.5	0.7
04339	00	V	500	27	0	3	4.4	0.6	0.3
04339	12	V	500	24	0	0	4.1	0.0	-0.8
04360	00	V	500	29	0	3	4.5	-0.6	0.4
04360	12	V	500	26	0	3	4.1	-1.6	1.1
08001	00	V	500	27	0	0	3.3	0.1	-0.7
08001	12	V	500	29	0	0	3.5	1.1	-1.2
08508	12	V	500	26	0	0	2.3	-0.1	-1.0
08594	12	V	500	21	1	4	3.7	5.2	1.2
60020	00	V	500	26	0	0	1.9	-0.3	-1.1
60020	12	V	500	29	0	0	3.0	-0.9	-1.1
71600	00	V	500	29	0	0	4.5	0.3	0.4
71600	12	V	500	29	0	0	3.2	2.3	0.8
72201	00	V	500	26	0	0	4.5	1.9	-1.3
72201	12	V	500	25	0	0	3.7	-0.5	-0.7
72402	00	V	500	24	0	0	3.5	1.1	-0.3
72402	12	V	500	27	0	0	3.0	2.0	0.5
74494	00	V	500	26	0	0	2.7	0.0	0.7
74494	12	V	500	27	0	0	2.9	-0.6	0.5
78016	12	V	500	28	0	0	2.6	2.0	0.7

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45